DOCUMENT RESUME

ED 154 788 IR 005 853

AUTHOR	Djawan, Djafar Esmaili
TITLE	System Planning for Agricultural Education in Developing Countries. Technical Report No. 14.
INSTITUTION	Stanford Univ., Calif. Stanford Electronics Labs.
SPONS AGENCY	National Iranian Radio and Television, Tehran.
PUB DATE	Dec 76
NOTE	238p.; Fig. IV. 19 (p181-192) may reproduce poorly; For related document, see IR 005 859
EDRS PRICE	MF-$0.83 HC-$12.71 Plus Postage.
DESCRIPTORS	Adult Education; *Agricultural Education; Course Content; Course Descriptions; *Curriculum Development; *Developing Nations; *Educational Radio; *Educational Television; Planning; *Systems Approach; Tables (Data)
IDENTIFIERS	Iran

ABSTRACT

The purpose of this report is to define a systematic process for developing television and radio programs to support the education of farmers in developing nations and apply that process to the Iranian situation. The first part of the step by step process is the development of the set of courses for the broadcast media in conjunction with national agricultural planners and agricultural subject area experts; the result is a sequence of specific course elements defined for production. The second part of the process results in a series of broadcast schedules for the different transmission stations of the country. The report provides an analysis of Iran's National Cropping Plan, the definition of content of the courses, and the definition of broadcast schedules. A number of charts and tables detail the present agricultural situation in Iran. (VT)

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SYSTEM PLANNING FOR AGRICULTURAL EDUCATION IN DEVELOPING COUNTRIES

ED154788

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by

Djafar Esmaili Djawan

December 1976

Technical Report No. 14
Prepared under
National Iranian Radio and Television Contract
NIRT No. 1

Radioscience Laboratory
COMMUNICATION SATELLITE PLANNING CENTER
Stanford University
Stanford, California

IR00 5853

ACKNOWLEDGMENTS

This report was developed by Dr. Djafar Djawan of Stanford University, supported by NIRT Contract No. 1. He was assisted in the work by Dr. Lawrence T. Brekka, Consultant to the Communication Satellite Planning Center, Professor Douglas Daetz, Department of Industrial Engineering and Professor Bruce B. Lusignan, Director of the Communication Satellite Planning Center. Guidance was also supplied by Professor Walter Falcon, Director of the Food Research Institute, Stanford University.

Many more than these, however, contributed to the information contained in this report. While the authors remain responsible for any shortcomings in the report, acknowledgments are made to the many experts who contributed their time and expertise to the study.

Special thanks goes to Professor Doyle Reed of the University of California at Davis whose advice was essential to the organization of the agricultural courses and development of their content.

The work could not have been accomplished had Dr. Djawan not been able to meet extensively with many other agricultural experts. Specific thanks goes to the experts of the Ministry of Agriculture and Natural Resources in Iran, other experts at the University of California at Davis, Utah State University, the U.S. Department of Agriculture and the Food and Agriculture Organization. The names of the experts are listed in the Appendix. Their contributions are gratefully acknowledged.

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CHAPTER I

INTRODUCTION

The purpose of this report is to define a systematic process for developing television and radio programs to support the education of farmers in developing nations and apply that process to the Iranian situation.

A. NEED FOR FARMER TRAINING

With population growth, many nations of the world are facing severe food shortages now or in the near future. The farmers of these nations often employ traditional farming practices with productivity one-half to one-third of what it could be using more efficient techniques. In many areas, two to three times the current production can be realized without major introduction of capital or aggregation of land into very large holdings.

In many of these nations a high percentage of the population is in farming. The farmers are scattered widely throughout the country on small individual family farms or medium sized holdings providing employment for several families. In many developing countries such holdings constitute the majority of the arable land.

Where these conditions exist the economic growth and the future food resources of the country can depend heavily on the introduction of efficient farming practices to the traditional farmers. (See references [1, 2, 10, 11, 24, 26, 27, 35].)

B. LIMITATIONS OF AGRICULTURAL EXTENSION SERVICES

The normal approach used to improve farming in these countries is to develop agricultural extension services which employ and train a number of field staff. These extension workers visit the farmers periodically, describing the improved practices and attempting to persuade the farmers to adopt them.

The effectiveness of the agricultural extension services in many developing countries is limited by a number of conditions.

- The numbers of farmers is so large that the size of the extension service is inadequate to the job. In many countries there are 1,000 or more farm families for each extension worker. Limitations of extension service training institutions and ministry budgets often do not allow major increases in the number of extension workers.

- The farmers are scattered widely throughout the country in small communities often served only by marginal roads. Much of the time of the extension workers must be spent in traveling from one community to another to reach the farmers.

- The information important to the improved production often covers many subject areas. The extension service workers often are not sufficiently experienced to provide effective advice to the farmer in more than a few of these areas.

- Much of the information, in order to be effective, must be presented close to the time that the farmers are engaged in the particular activity. Information on improved planting techniques, for example, will be more effective if given to the farmer shortly before he starts his annual planting. The limited numbers of agents and transportation difficulties often make timely provision of advice impossible.

- Often, extension service workers assigned to a community come from the urban areas and, to overcome the limits in numbers, many countries use agricultural extension service as an alternative to military service. Some participants lack motivation, others lack respect for the cultural values of the farmers. This reduces the effectiveness of their work in the village.

- The traditional farmers often have a high rate of illiteracy which greatly restricts the use of printed materials to overcome the above limitations. The above problems arise from the characteristics of traditional farming in developing countries. Often, despite major commitments to agricultural education by the governments, these limitations restrict the effectiveness of the programs.

(See references [12, 17, 19, 50].)

C. USE OF BROADCAST MEDIA

Where a country needs to introduce efficient farming practices to its traditional farmers and is faced with limits of its extension service, it can consider radio or television as an effective means for farmer education.

Used in conjunction with existing agricultural advisors, these broadcast media can offer solutions to many of the limitations described above.

The form of media-based farmer education normally includes the advisor contacting a lead farmer in the farming community to act an an intermediary. This farmer is responsible for encouraging others in the community to listen to the programs and discuss the materials. He also provides a means of communications between the community and the extension worker, informing the community of government projects and information services beyond those covered on the media and informing the extension service of the community's needs.

Used in this way, the broadcast media offer the following advantages.

- The basic information can be provided to the farmer as often as needed, limited only by the farmer's time availability and interest, not by the ability of the extension worker to get to the community.

- The message through the broadcast media can be developed by the country's best agricultural experts and thus not be limited by the experience of the extension worker.

- The broadcasts can be timed to present information when it is best for acceptance of the farmers (e.g., programs on improved planting can be broadcast shortly before planting time).

- The media programs can use traditional farmers in illustrations of the practices being described and similar techniques to make the message more acceptable to the local farmers. This, and use of the lead farmer in the community as a link to the extension service, can reduce the problem of local acceptance.

- Broadcast media will not eliminate the problem of motivation of the extension service agent when it exists. However, it can reduce the dependence on the agent and perhaps allow him to be more effective in a more limited role.

- The broadcast media through sound and pictures (where television is used) can effectively present information to farmers even when they are illiterate.

Broadcast media have been used effectively in this way in limited projects in some countries, but there are questions that should be answered before a full program is undertaken.

It is not clear whether the full flexibility of the broadcast media can be used effectively. The preferred crops and the growing seasons can vary greatly in different regions of a country. This will introduce

complexity into the program production and broadcast scheduling. While some concepts are clearly effective for television or radio presentation, others are too complex and may require direct explanation by an expert. Others may be theoretical and not critical to bringing about the desired change. When these factors are taken into account, it is not clear initially whether the amount of programming that is needed is compatible with the time availability of the farmer or the production capabilities of the radio or television facilities within the country.

To define the broadcast programming, the above complexities must be systematically approached. A step by step process has been developed to accomplish this. The process is for broadcast planners to use in conjunction with national agricultural planners and agricultural subject area experts.

The step by step process is felt to be general in application and can be used for any country with a large number of traditional farmers and limited agricultural extension services. Applying the process to Iran's agricultural situation has resulted in a clearer definition of the specific steps of the process and at the same time defined a specific set of courses to support Iran's agricultural goals.

Many of the programs and broadcast schedules developed for Iran cannot be directly used for other countries because of variations of agricultural goals and agroclimatic conditions. However, Iran's agricultural conditions are as complex as are likely to be found in a developing country and thus represents an important example. The amount of programming for Iran is very acceptable (about 50-60 program hours total) and the broadcast schedules are reasonable; this result is expected to be true for other developing countries. (See references [1, 6, 17, 50].)

D. AGRICULTURAL PROGRAM PLANNING PROCESS

The problem of regional variation of agricultural conditions is handled by developing a common set of program segments and then using these segments to develop a separate broadcast schedule for each region. The first part of the process develops the set of courses; the result is a sequence of specific course elements defined for production. The second part of the process results in a series of broadcast schedules for the different transmission stations of the country.

1. Production Definition

a) Define Agricultural Goals

The first step of the process is carried out in conjunction with the agricultural planning experts in the country. The agricultural plan for the country will define the changes that are needed to bring about desired improvements in agricultural production. It should include target goals for different crops, development of water and land resources, introduction of agribusiness, change in farming practice, etc.

b) Define Role of Traditional Farmer

The set of changes represented in the national agricultural goals will cover all sectors of agriculture. The second step is to separate out those changes that are related to traditional farmers. This separates out development of agribusiness and government projects that do not require education of traditional farmers. It also defines the importance of the traditional farmers to the overall national goals. The changes defined for the traditional farmers serve as a potential set of objectives for the agricultural education programs.

c) Define Course Topic Areas

The next step is critical to the process of getting input to the course planning process from the agricultural subject area experts. This step defines the major course topic areas (courses). The courses divide the material into major categories and each expert is to be asked initially to make contributions only within his area of expertise. This major division is selected to simplify the questions to the experts and to efficiently organize the responses. The divisions are somewhat arbitrary and flexibility should be maintained in interaction with the subject area experts to revise the categories. For Iran, subject areas defined in the national agricultural plan served as an initial categorization. This was later modified slightly as a result of interaction with the experts. The modified list, shown below, could serve as a starting point for application to other countries as long as flexibility to modify the list is maintained.

TABLE I.1
List of Major Course Areas

A - Farm Management	E - Fertilizer Application
B - Animal Husbandry	G - Weed Control
C - Agricultural Machinery	H - Plant Diseases
D - Soils and Soil Conservation	I - Pest and Insect Control
E - Water and Crop Irrigation	J - Additional Information for Specific Crops

See references [1, 2, 3, 4, 8, 10, 11, 13, 16, 17, 23, 24, 26, 27, 44, 51] to augment information in above Sections a), b), and c).

d) Selection of Priority Crops

Selection of the most important crops to include in initial productions is the next step. This selection comes mainly from the national agricultural plan and should include the following criteria:

- Importance in total demand
- Projected improvement in productivity
- Number individual farmers growing crop
- Substitutability by other crops
- Role relative to crop rotation (leguminous fodders can be critical to maintain N_2)

The most important crops should then be covered in the course materials. A list of the next level of priority can be developed in a similar manner. Because of the flexibility of the course elements developed in the next section, the second group of crops could be added to the courses without major revisions.

e) Definition of Content

The next step is to acquire the input from the experts themselves. Each subject area expert is asked to describe a series of short "course elements" to cover the material in the course. The general objectives come from steps c) and d), but are organized into course elements subject to the following criteria:

- Each course element is to stand alone if possible, i.e., it should not require that the farmer have listened to some previous element. This allows flexibility of scheduling broadcasts and reduces the impact of irregular farmer viewing habits.

- General background information or theory not important to describing the change needed by the farmer should be eliminated.
- The information should be oriented toward the problems as seen by the farmer.
- Information that cannot be effectively given to the farmer through the broadcast media should not be included in the courses. If appropriate, the media program should refer the farmer to the available advisory service for the needed information.
- Needless duplication should be avoided, e.g., if irrigation techniques for several different crops can be described clearly in one program, they should be.
- Necessary duplication should be included, e.g., if weed control varies from crop to crop, more than one course element should be made.

In this step it is important to develop the information separately for the different course areas to reduce the complexities as seen by the subject area experts.

f) Review and Consolidation

The next step is to review the courses together to identify and eliminate duplication and to ensure consistency where an element of one course is related to another. This process is done with the experts where each expert is encouraged to suggest additional elements or eliminations. Steps e) and f) are repeated a number of times to finalize the course descriptions.

g) Time and Schedule Characteristics

The final step of the course production description is to define:

- the length in equal segments of each course element. (In the Iran case, the elements could be fit in a number of 15-minute segments.)
- the relationship, if any, to the availability of government programs or resource inputs. Courses requiring such inputs should not be broadcast until the input is available.
- the sensitivity, if any, to broadcast time. This should indicate when courses should be broadcast in relation to the farm activities.

This information can be acquired during steps e) and f). It is used in the scheduling procedures.

To augment the information in the above Sections d), e), f), and g), please see references [1, 3, 6, 22, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49].

2. Schedule Definition

a) Farmer Time Availability

The first step of the schedule definition is to define the time availability of the farmer. This includes the definition of seasonal workload variation, days of the week, and hours of the day that he could listen to the program. Holidays or religious periods should be included.

b) Define Common Schedule Areas

The second step is to define areas with common broadcast schedules. This is done by identifying the broadcast schedule for each of the crops selected for each area that can get separate broadcast signals. Next, areas with common schedules for all crops grown in the area are combined into common broadcast areas.

c) Develop Individual Schedules

The third step is to take areas with common schedules and develop each schedule. Courses with critical time dependence are scheduled first, including repeats if the message requires it. Other courses are filled into available time slots, avoiding times of highest farmer activity if possible.

d) Control Broadcast of Project or Input Related Courses

The final step is to identify the courses that depend on government programs or special inputs. Those courses should be added to the area schedule when the programs or inputs are available.

E. THE CASE OF IRAN

Iran is faced with a large dispersed agricultural population. Of 32,000,000 total population, 18,000,000 are rural; 80% of the active farmers are illiterate.

The rural population is located in widely scattered communities. There are over 64,000 villages of which 18,000 have a population of 250 or more. Government programs and services tend to concentrate on the larger market towns of 2,000 to 5,000 population, of which there are approximately 1,200 market towns which serve about 13,000 villages with 150 people or more and

many smaller villages with less than 250 people. The other villages are expected to have migration over the years to the larger villages or to market towns. Still a little less than half of the agricultural workforce will remain in the villages not easily served from larger market towns.

The growing population of Iran will demand an ever increasing amount of food. The agricultural planners estimate that about a threefold of agricultural productivity will be needed to make the country close to independent from food imports (only a portion of demand for red meats will still have to be satisfied). Achieving this goal will be extremely important in the next 20 years, when the revenues from oil production are projected to decline and ability to import foods is less.

To achieve a threefold increase in food production in twenty years is an ambitious but essential goal. The agricultural planners, however, conclude that introduction of more efficient practices to Iranian agriculture will be able to have major contribution to this increased production.

Over 85% of Iran's farm land is in more than 2,500,000 small-to medium-sized traditional farms, which have low productivity. While agribusiness can be expected to make significant improvements in production, still the great majority of the improved production will need to come from the two to three million traditional farmers, according to the National Cropping Plan.

The agricultural extension services in Iran employ about 2,000 service agents as permanent workers, and coordinates another 3,000 or more serving alternative military service. While these programs represent a major commitment to farmer education, the activities are faced with the very real constraints described in Section B, above.

Iran is committed to expansion of national television to give high percentage coverage to these rural areas and thus there is the very real opportunity to increase the effectiveness of farmer education programs through introduction of television.

However, Iran also has highly varied agricultural conditions from region to region. The water availability, growing seasons, mix of crops and animal raising vary widely in different locations. The areas of farm practice that need improvement are many and present a complex educational design problem. (See references [1, 2, 3, 4, 8, 9, 24, 25, 26, 51].)

F. SUMMARY OF RESULTS

The process described in Section D was applied to the Iranian agricultural situation. Over 80 agricultural experts were involved in detailed subject area contributions and review process. These include subject area experts from Iran and the national planning group that developed the national cropping plans. The conclusions of the applications are as follows.

- The step by step procedures described in Section D were very effective in being able to reduce the complexity and receive clear, accurate input from the experts. The process converged rapidly to an efficient set of courses and schedules.
- Review of the plan indicates the very key role of farmer education in achieving the farm productivity necessary to the country. The single resource the planners could not see an answer for was the skill of the farmers.
- The experts, including those with media experience, said that many of the messages to be given through the media would require the visual information through television. Much of the specific

advice could not be effectively given through radio. While radio will clearly be useful in some subject areas, there would be others that would have to be ignored.

- The total program production required for the high priority crops is less than 50 hours.

- The broadcast schedules (different for 10 different regions) can meet the requirements of being compatible with farmer listening time and effective timing of the message to the farm activity.

- The priority for this specific project among other educational media projects should be very high. The 50 hours of programs are directly and strategically related to the efficiency of the agricultural workforce of the country, about 3,400,000 out of 7,200,000 total workers (i.e., one strategic course sequence covers half of the total workforce).

The importance of the improved skills of these farmers to Iran is very high. Their improved productivity would increase crop yields by over 200,000 million Rials annually ($2.8 billion). The well-being of the population in the next twenty years will be critically dependent on achieving this threefold increase in food production. The broadcast programs, of course, are not the only input that is required to achieve the increase; however, farmer education is a critical input and without the improved farmer skills, the increase cannot take place.

The following chapters cover the analysis of Iran's National Cropping Plan (II), the definition of content of the courses (III), and the definition of the broadcast schedules (IV).

CHAPTER II

RECOMMENDATIONS FOR IMPROVEMENTS IN IRAN'S AGRICULTURE

A. INTRODUCTION

In developing a national agricultural plan, a number of very complex factors have to be taken into account. The major categories can be summarized as follows:

- Natural conditions. These include climate, availability of water, soil types and salinity, and the growing potentials of different crops in different areas of the country.
- Agro-economic conditions. These include typical farm sizes, existence of farm cooperatives, existence of agrobusiness, mechanization and availability of labor, development of irrigation projects, and projection of markets for different crops.
- Socio-cultural and institutional conditions: Socio-cultural conditions include local language or dialects, cultural groups, local diets (affecting selection of subsistence crops, etc.). (These factors are mostly related to the ability to bring about the desired changes.) Institutional conditions include administrative boundaries defining local responsibility for planning and advisory services.

The National Cropping Plan [1] develops an estimate of future demands for agricultural products, analyzes the natural conditions and the potential of the agricultural resources, and recommends a mix of crop selections and agricultural practices that will allow future food demands to most nearly be met. The plan calls for production increases by 1992 of 200% to 500% over 1972 levels for most major farm products. The increased production is needed to make Iran much less dependent on agricultural imports in the next twenty years.

A major part of the increased production must come from small to medium sized farms and requires that the farmers adopt more efficient practices and select a better mix of crops and livestock. The role of the agricultural training programs developed in Chapter III is to help provide the farmers with the information needed to make these changes.

In this chapter, the major recommendations of the National Cropping Plan are summarized. Next, the role of the small to medium sized farmer in Iran is described. Finally, more detailed discussion is presented on the changes required to meet the agricultural objectives. These changes are related to the information needed by the small farmers and serve as the basis for the development of specific courses in the next chapter.

B. MAJOR RECOMMENDATIONS OF NATIONAL CROPPING PLAN

Iran's agricultural resources vary greatly in the different agro-climatic zones. Determining the best choice of crops and growing practice for each area is a complex optimization process that is developed in the National Cropping Plan [1] and summarized in Volume I of the Plan. The major recommendations are described below.

Iran will not be able to achieve total self-sufficiency in all its food commodities by 1992, but there are two major directions that can be pursued with one appearing more attractive than the other. Iran can either,

- achieve self-sufficiency in red meat and milk and therefore rely on imports for a large proportion of grain and other commodities;

or it can

- achieve self-sufficiency in grain and other commodities and import a large proportion of red meats.

The Plan recommends the latter option for Iran's planning. Their reasons are as follows:

- Self-sufficiency in red meats would be extremely costly in terms of value added to the agricultural sector.
- The supply of white meat, poultry and eggs would be possible at much lower cost.
- To produce 79% of the projected demand for red meat in 1992 would require that 70% of the irrigated area be devoted to fodder production.
- Agro-ecological conditions of the country are better suited to grains, oil seeds, sugar, cotton, fruit and vegetables; these crops require less water than fodder crops.
- These crops are the commodities of basic survival and are already produced by the traditional farming methods.
- World food shortages for these basic commodities could occur periodically limiting the ability to import them.

Therefore, the National Cropping Plan proposes that Iran develop its agriculture towards becoming independent in grains and other basic commodities and plan to import a large proportion of red meats. The selection of crop production levels for different areas is a complex process matching demand to suitability of different lands for different crops. The recommended cropping pattern for 1992 is summarized in Table II.1 [Ref. 1, Vol. I, p. 146]. As is shown in Table II.2 [Ref. 1, Vol. I, p. 147] this mix of crops would satisfy the 1992 projected food demands in grains and most basic commodities, including poultry and eggs, but cover only 30% to 40% of demand for red meats and milk. (In this table, wheat and pulse grains surplus to human needs have been added to the animal feed stuffs and converted to animal products.)

TABLE II.1
Gross Crop Production 1992 (1000 tonnes)

	Markazi Semnan	Gilan Mazandaran	E.Azarbijan W.Azarbijan Zanjan Kordestan	Kermanshahan Hamadan Lorestan Ilam	Khuzestan	Esfahan Yazd	Boyer Ahmad Charmahal Fars	Saheli Bushehr	Kerman Sistan and Baluchestan	Khorassan	TOTAL
Wheat (irrig)	278	202	752	709	180	150	333	20	157	274	3055
(rainfed)	188	494	1339	1406	221	62	437	25	10	450	4632[8]
Barley (irrig)	121	47	318	93	129	46	125	26	50	219	1174
(rainfed)	94	117	358	296	55	16	96	12	5	212	1261[9]
Rice		1788			943						2731
Maize	117	216	320				144			196	993
Sorghum					133			42	70		245
Pulses (irrig)	15	62	131	96	74	40	25	10	67	71	591
(rainfed)	19			68							87
Oilseeds(irr)[1]	31	99[4]	174[5]	99	15[6]	44[7]	60		71	46	639
(rainfed)				136							136
Cotton(irrig)	41	257	33		158		43		81	43	656
(rainfed)		120									120
Sugar beet	440		2160	480	1350	1000	720		400	1340	7890
Sugar cane					6000						6000
Potatoes	120		960	80	300	240	160		200	140	2200
Cucurbits	387	216	292	163	555	340	258	108	332	419	3070
Market garden[2]	350	276	120	136	1200	151	118	350	380	70	3151
Fruit	788	462	958	256	210	244	532	195	244	559	4448
Nuts	17	11	23	2		22	20		200	49	344
Green fodder (silage)	978	690	2382	1314	2925	495	754		600	1007	11145
Green fodder (rainfed)		780	1903	2486	333	81	738			72	6393
Legume hay[3]	338	457	1528	285	676	91	183		47	274	3879
Tea (green leaf)		88									

1 Sunflowers, except where otherwise specified
2 Includes onions, tomatoes, early potatoes
3 Includes production from within orchards
4 Includes 64,000 tonnes soya beans
5 Includes 50,000 tonnes soya beans
6 Linseed
7 Includes 3000 tonnes soya beans
8 To be reduced to 4371 to allow for return of sub-marginal land to range
9 To be reduced to 1130 to allow for return of sub-marginal land to range

TABLE II.2

Recommended Pattern Compared with Forecast Demand

Commodity	1371 (1992) demand '000 tonnes	Forecast gross production '000 tonnes	Per cent of forecast	Production increase over 1972 per cent
Wheat (human)	7386	7426	100	180[1]
Rice (paddy)	2618	2731	104	251
Pulses (human)	431	431	100	408[1]
Soya, sunflower, and cotton seed	1492	1280	86	372
Vegetable oil	498	421	85	
Sugar	1866	1626	87	265
Potatoes	)	2200		551
Cucurbits	) 6461	3070	130	240
market garden crops)	)	3151		516
Fruit and nuts	5311	4792	90	278
Cotton lint	300	256	85	150
Linseed oil	no projection	5	-	-
Mutton [2]	1142	344	30	88
Beef	489	157	32	45
Milk	7993	3443	43	79
Poultry	368	405	110	440
Eggs	328	361	110	325

1 of gross production

2 including goat meat

As shown in Table II.2 and II.3 [Ref. 1, Vol. I, p. 149] this represents an increase in production of the major crops by factors of two to six. This improved productivity is to come from increased irrigation, better crop and livestock selection, use of fertilizers and, most importantly, from improved farm practices.

At the assumed 1992 crop prices, the value of the 1972 agricultural output is estimated at 133,000 million Rials as compared with a value of 362,000 million Rials for the projected 1992 output. The value of the increased productivity is thus projected to reach about 230,000 million Rials per year (about 3.3 billion dollars per year).

C. THE ROLE OF SMALL AND MEDIUM SIZED FARMS

In projecting the increased productivity Ref. 1 [Vol. I, p.156][24] takes note of the fact that the great majority of the improvement is to come from small to medium sized farms operated in traditional ways. Meeting the 1992 agricultural goals is thus dependent on Iran's millions of small farmers adopting more efficient farming practices.

The 1974 distribution of farms by size is shown in Table II.4 [Ref. 1, Vol. 3, p. VII.136][2][25] 83.6% of the total farm area is in 2,500,000 small to medium sized farms (less than 50 hectares); only 16.4% of the land is in larger units with more central management. If the smallest farms (less than two hectares) are not included, still over 78% of the area is in 1,300,000 farms between 2 and 50 hectares in size.

Table II.5 [Ref. 1, Vol.3, p.140] presents the contributions of different sized farms to the marketable surplus (the value of crops sold after home-consumed surplus has been deducted). This shows that a large proportion, 77%, of the marketable surplus comes from small and medium sized

TABLE II.3

Estimated Growth in Crop Production: (1351-1371)(1972-1992)

Commodity	thousand tonnes Gross Production 1351 (1972)	1371 (1992)	Average annual growth rate per cent
Wheat	4270	7426	2.8
Barley	1029	2304	4.1
Rice (paddy)	1088	2731	4.7
Maize, sorghum	41	1238	18.6
Pulses	166	678	7.3
Oilseeds	57	775	13.9
Cotton (seed cotton)	516	776	2.1
Sugar beet	4210	7890	3.2
Sugar cane	1040	6000	9.2
Potatoes (main crop)	399	2200	8.9
Cucurbits	1279	3070	4.5
Market garden crops (1)	600	3151	8.6
Fruit	1639	4448	5.1
Nuts	85	344	7.2
Cereal fodder (dry), legume hay	2166	3879	3.0

(1) Includes tomatoes, onions, early potatoes, herbs and dyes.

TABLE II.4

Present Distribution of Farms in Iran According to Size

Size Group Ha	Total area Ha	Percent total area	Percent of area Irrig.	Dryland	No. of holdings	Farm %	Ave. size Ha
1	299,600	2.0	4.3	0.5	801,000	31.6	0.4
1-2	486,200	3.2	5.6	1.8	342,000	13.5	1.4
2-5	1,812,500	11.8	14.4	10.2	545,000	21.5	3.3
5-10	3,178,900	20.7	18.2	22.2	434,000	17.1	7.3
10-50	7,031,800	45.9	33.2	53.4	394,000	15.6	17.9
50-100	703,000	4.6	5.4	4.2	10,000	0.4	70.3
100	1,811,000	11.8	18.9	7.6	7,000	0.3	258.7
TOTAL	15,327,500	100.0	100.0	100.0	2,533,000	100.0	6.1

TABLE II.5

Contribution to National Marketable Surplus by Farm Type in 1974

	PRS (million rials)	Per Cent
Small traditional rainfed	4545	4.1
Small traditional minimal and partial irrigation	22987	20.8
Small traditional full irrigation	19650	17.7
TOTAL SMALL	47182	42.6
Medium traditional rainfed	7575	6.8
Medium traditional minimal and partial irrigation	22988	20.7
Medium traditional full irrigation	19650	17.7
TOTAL MEDIUM	50213	45.2
Large traditional partially irrigation	9000	9.1
Large medium fully irrigated	1837	1.7
Large modern fully irrigated (Farm corporation) and Agrobusiness.	2625	2.4
TOTAL LARGE	13462	12.2
TOTAL ALL FARMS	110857	100.0

The main points arising from Table VII.5.3 are as follows:-

i) only about 11 per cent of the marketable surplus is derived from rainfed cultivation.

ii) a large proportion (77 per cent) of the marketable surplus is derived from small and medium sized traditionally operated irrigated farms.

iii) only a minor proportion (4 per cent) is derived from modern large units.

traditionally operated irrigated farms and another 11% from small and medium sized rainfed farms. Only 4% of the national marketable surplus comes from modern large farm corporations and agrobusiness. Another 9% comes from large, but traditionally operated, units.

The productivity improvements are projected to be high or higher for the small to medium sized farms than for larger units. The cash value of the increased production from small and medium units is projected to be about 200,000 million Rials per year (about $2.8 billion dollars per year). Thus, a great majority of the improved national productivity projected by the National Cropping Plan must come from the small to medium sized farms managed by individual families. An essential part of achieving the agricultural goals is introduction of improved farming methods to Iran's small traditional farmers. Without this, the improvements needed by 1992 cannot be achieved.

[The media courses described in Chapter III are directed to this farm population. The characteristics of the traditional farmers present educational challenges covered in more detail in Chapter III. According to the National Cropping Plan, the larger farm units also have shortages in skilled manpower and need improved techniques to increase productivity. While the media courses can be expected to contribute to these needs as well, the primary audience should still be the operators of small to medium farms.]

D. FACTORS AFFECTING CROP PRODUCTION

For medium and small sized farms there are a large number of areas where improvements will be needed. The importance of improvements vary from place to place with soil and climate conditions, irrigation system,

and farming practices. Below, the major areas of improvement are described. Identification of the needed improvements is the basis for the content of the media courses developed in Chapter III. The major topic headings are:

1. Soil and Soil Conservation
2. Water Use
3. Crop Intensity
4. Fertilizer Use
5. Crop Protection
6. Horticulture Management
7. Proper Mechanization
8. Livestock Management
9. Farm Management and Cooperatives

A summary of the recommendations drawn mainly from the National Cropping Plan is included below for each topic.

1. Soils and Soil Conservation

The soil and water are the two main natural resources in Iran for agricultural productivity. The surface area of Iran amounts to 165 million hectares. In this area twenty-seven soil associations can be found. They occur in four main physiographic areas and can be categorized, in terms of potential productivity, as "good," "moderately good," "poor to very poor," or "nil."

There are presently 3,600,000 hectares of irrigated land out of a total of 15,500,000 hectares of cultivated lands. The National Cropping Plan concludes that the major accessible soil resources of good potential still unused or not fully developed are the fine-textured alluvial soils,

and the brown and chestnut [illegible] ubject to topography and water availability, virtually all these soil associations could become a productive irrigated area, adding three million hectares to the land presently irrigated. There are also 2.5 million hectares of unused saline-alluvial soils and one million hectares under dryland farming. These latter million hectares, and some, at least, of the 2.5 million, can certainly be converted to productive irrigated farming if water can be found.

The remaining soils of good potential for irrigation are in pockets in the mountainous lands, particularly in the semi-arid region where it is estimated that they may add up to about 1.8 million hectares. Of these, about 0.8 million may receive some irrigation at present. Provision of small storage works might add a further 250,000 hectares of new irrigation.

There are some 12 million hectares of good potential soils and a similar area of moderate potential desert soils of the Central plateau. Without water, these soils are useless for arable farming, and it cannot be expected that the latent potential of these soils will be developed on a significant scale within a 20-year period.

There are two million hectares of unused Brown and Chestnut soils, over half of which could be brought into crop production, and there is considerable scope for increasing yields on the existing cultivated area by appropriate land and moisture conservation practices and by selection of suitable crops in accordance with terrain characteristics. Where water is available and the land commandable, irrigation should be possible since the properties of the soils are suitable for irrigation.

There are some three million hectares of mountainous and piedmont lands in the humid-subhumid region, all with good potential for forestry;

the less steep lands could also be used for orchard crops.

The National Cropping Plan concludes that, overall, land is not a constraint. The productivity of most of the land at present cultivated could be substantially increased. In rainfed farming areas, this would be by soil and water conservation measures and associated inputs. In irrigated areas this would be accomplished by increased cropping intensities wherever water is available and by improved irrigation management generally.

2. Water Use

The discussion of water use can be divided into three topics:

- the potential water supply,
- regulation of the water supply, and
- efficient use of the water on the farm.

a. The potential water supply. A comprehensive inventory of water resources of Iran has yet to be completed. The national water plan, preparing an assessment of water resources available in Iran, will not be available before 1977. However, information is available from which initial estimates can be made. It is useful to discuss surface and ground water separately.

i) Surface water. Different agencies estimate surface water availability between 90 to 105 billion cubed meters (m^3) per year. The information about surface waters actually used for agriculture also differs from agency to agency, ranging from 25 to 49 billion m^3. Part of the discrepancy may arise because some estimates do not account for evaporation or the use of unlined transport ditches from dam to point of

use with loss to absorption in the soil. The main volume of surface water is generated by runoff from melting snow and is concentrated over the spring period (March 21 to June 21, Farvardin to Khordad). Rainfall varies from region to region.

The irrigation of many crops begins during the spring period, but critical water requirements occur in summer (the months Tir or Mordad) when the base river flows are at their lowest and may cease altogether. The cultivation of summer crops, therefore, requires a high volume of water storage in order to provide timely water supplies.

The mean annual runoff available for development in Iran varies from 40% in areas of low runoff to over 70% in areas of high runoff. It should be noted that generally a reliability factor of 80% is probably the minimum required for development of irrigated agriculture, which means that adequate supplies would be available four years out of five. Therefore, a high degree of storage through the year will be required in many areas of Iran.

ii) Ground water. The ground water tends to occur in three essentially different physiographic situations: (1) intermountain basins (high yield); (2) the central plateau basis (variable recharge); (3) the coastal region (variable recharge). Estimates have been made on its extent. Both the Plan Organization and the Ministry of Energy have calculated ground water recharge for the whole of Iran by means of surface water balance computations. The two estimates are 35 billion m^3 and 33 billion m^3 per annum, respectively. The present ground water yield is around 20 billion m^3, suggesting that some 13 billion m^3 of groundwater drains away each year. The National Cropping Plan considers that 4 billion m^3 of this could be saved with further development. This increased usage could be carried out without any major depletion of the groundwater system.

b. Regulation of the Water Supply.

i) Surface water storage. Because of irregular distribution of river discharges over time which do not fit with agricultural irrigation demand, surface water storage reservoirs are needed. Reservoir use is complicated by the fact that Iran has a serious problem with erosion of reservoir catchment areas. The result is heavy sedimentation which can severely limit the useful lifetime of storage reservoirs.

The reservoir capacity behind dams already constructed is 10 billion m^3 and the total land areas supplied by these reservoirs is about 800,000 hectares, or 22% of the total irrigated area of the country.

ii) Ground water abstraction. One third of the water presently used for irrigation purposes is abstracted from the ground water supply, and 35% of this ground water used comes from Ghanat (wells). This traditional method of tapping ground water is wasteful because it is unregulated. Regulation can be achieved by the progressive replacement of Ghanats by deep wells where hydrogeological conditions allow. Wells can normally be controlled to meet peak agricultural demand and avoid wasting water when it is not needed.

c. Efficiency of Water Use. From the point of main supply to the point of use on the individual farm, efficiency of the water transport system must be considered. In 1972, the water was used for 3.6 million hectares and it is projected by the National Cropping Plan consultants that this could be greatly increased.

The efficiency of water use can be improved by the following actions:

- Improvement of the main irrigation canals by construction of earth bunds on the uphill side, and by cleaning and grubbing.
- Construction of spillways, syphons, and other appropriate structures at crossings of the main channels with smaller, local distributaries to provide proper discharge of excess runoff.
- Construction of overflow catches, partial flumes, and other control structures in the main canal and distributaries. These are needed near the point of diverstion to permit better control of water distribution.
- Construction of irrigation water turn-outs for blocks of farms, and digging or clearing canals across existing fields in order to reach areas located at some distance from the distribution canal.
- Management of irrigation water for optimum use in critical growth periods for major crops, with particular attention to cereals.

A majority of these actions would have to be taken by the farmers, either individually or cooperatively.

3. Crop Intensity

Raising crop intensity in irrigated farm areas is dependent upon the availability of the natural resources, especially water, as described above. The water availability varies widely throughout the year and in different agricultural zones. The National Cropping Plan takes this information into account in considering the plans for crop rotation. The plans permit the selection of as many crops as possible suitable for the agro-ecological conditions. It is then also possible to prepare a crop calendar showing the periods in the year when each crop should occupy the land

for greatest productivity. The Plan suggests suitable crop calendars for 47 different agro-ecological sub-zones.

To derive the benefit from the suggested crop calendar, two basic assumptions are made:

- The crops produced by the plans are marketable.
- The farmers can effectively implement the recommended crop calendar patterns.

Persuading all farmers to adopt the crop calendar plan is a difficult goal. Individual farmers decide what to plant as a function of many factors in their own environment, including past success with crops, a personal view of the market, and food needs of the home. Education could give the farmer more information to improve his decision-making on crop selection, but it will probably not be effective to attempt to impose the crop plan without concern for the farmer's own experience. Therefore, convergence to the actual suggested crop calendar would probably occur only over a long time period.

4. Fertilizer Use

Improving land and supplying the needed water alone would not bring the maximum agricultural productivity. The National Cropping Plan consultant estimates that, given proper management and an adequate supply of inputs, including proper use of fertilizers, the extra 2.7 million hectares of "improved irrigated land" would be capable of providing crops with at least double the current mean yield.

5. Crop Protection

Although cultivation practices, pesticides and herbicides seldom are able to affect directly the potential crop yield, they do reduce major losses and, therefore, help toward maximum productivity. The intensification of agriculture will inevitably bring about changes in the insect pest complex, weed infestation, and crop diseases. Parallel to intensification of agriculture, pest, disease, insect and weed control should be improved.

6. Horticulture Management

The National Cropping Plan consultant concluded that cash surplus per hectare is highest with orchard farming, especially with nuts and pistachios. The demand forecasted for fruit and nuts in 1992 is an increase of 278% over the 1972 production level. This considerable increase in production should be met partially by improving orchard management and upgrading to the intensive system. Any new development should be accompanied with the specialization of certain farmers as orchardists. Major improvements in quality are necessary and attention to handling and marketing facilities is required.

7. Proper Mechanization

Using machinery, in most cases, decreases the cost of production, but should be based on several considerations. The main consideration is population density and labor force in the region. For most small farmers, farm machinery is not affordable. A cooperative could provide this machinery, or the government could establish leasing programs. The consultant for the National Cropping Plan emphasized that the success of the mechanization program will depend largely on the education of the farmers,

contractors, and managers, and the creation of service and spares network down to the sub-district level. It should be noted that introducing machinery should not contribute to underutilization of labor.

8. Livestock Management

The recommended changes in Iran's production of livestock are intended to reduce the stocks carried on rangeland in order to stop the rapid deterioration of this resource. In addition, better livestock breeds and more efficient management techniques are to be introduced. The changes are described under main types of activities.

a. Nomadic herds of sheep and goats on unimproved rangelands are projected to be slowly reduced over the next twenty years to reduce the rangeland grazing pressure. Such herds are least efficient in converting grass to meat products.

b. Partial range sheep and goats, which depend in part on products from cultivated lands, will reduce in numbers but increase greatly in productivity with improved management by farmers.

c. Partial range cattle of traditional farmers will also reduce in numbers but increase in productivity. These cattle will additionally serve as breeding stock for expansion of crossbred cattle (see paragraph e).

d. Equines will decline in numbers.

e. Improvement of the cattle through cross-breeding is projected to result in more productive, hardy breeds suited to more efficient milk and meat production. Crossbreeding with existing stock provides an effective

transition to higher productivity for the traditional farmer.

f. Housed sheep raising on large farms and by agrobusiness is projected to increase. Such enterprises will also provide feedlot facilities for animals raised by nomads and traditional farmers (see paragraphs a and b).

g. Housed cattle-raising will increase mainly for large, commercial dairy production with meat mainly as a by-product.

h. Large scale poultry enterprises for egg and meat production will grow as commercial enterprises, or possibly local cooperative enterprises. Small farm poultry raising will improve in efficiency but contribute mainly to consumption on the farm.

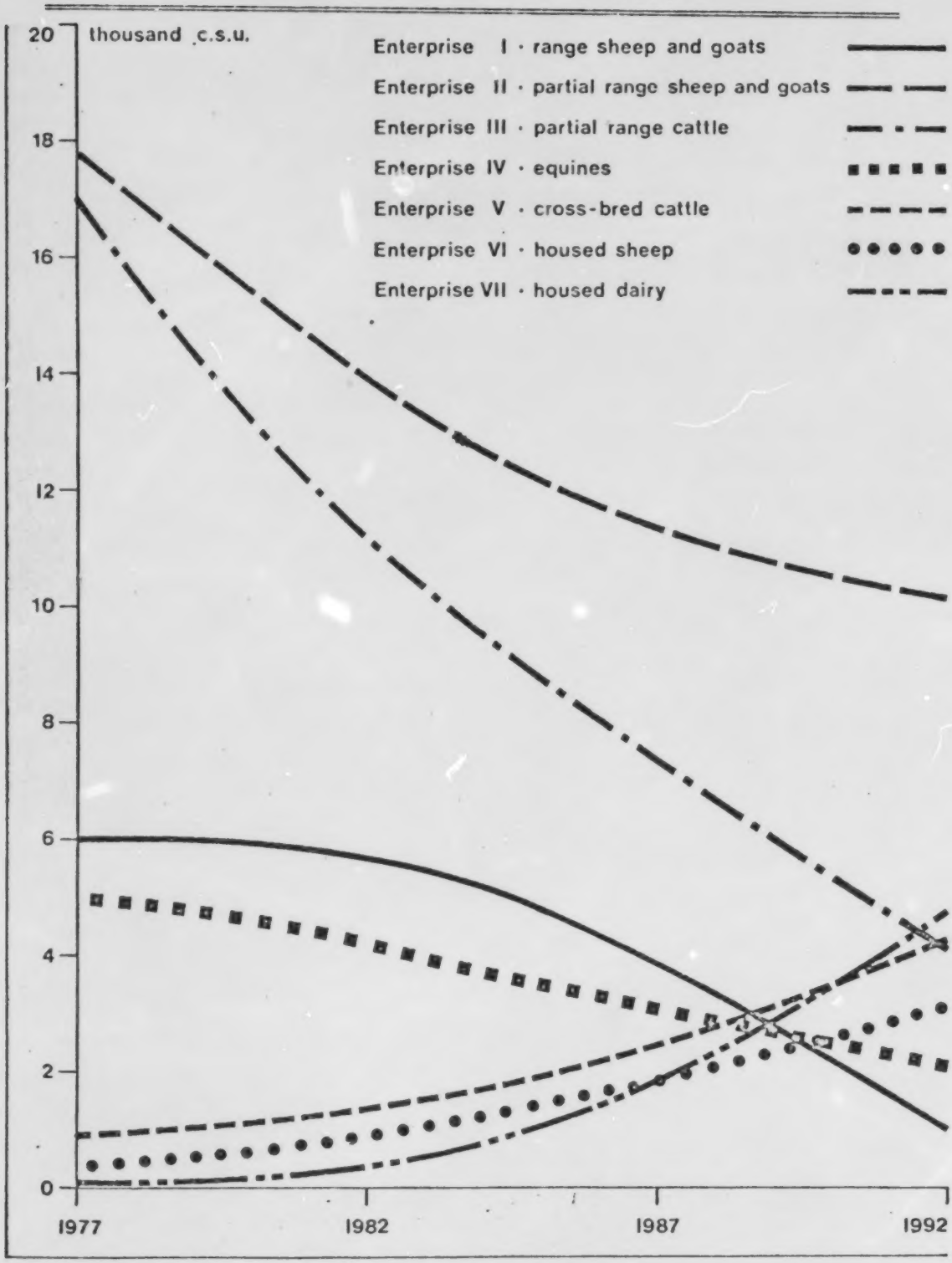
The projected changes in the numbers of animals in the seven different enterprises are shown in Table II.6 [Ref. 1, Vol. 3, p.VIII.59].

9. Farm Management and Cooperatives

On the small and medium sized farms the farmers are managers, decision-makers, operators, consumers and, in most cases, the market manager as well. In addition to knowledge related to the improvements described above, the farm operation will benefit from better knowledge of basic management skills. The important areas include: hiring of labor, water management, acquisition of inputs (seed, fertilizer, insecticides, hormones, etc.), equipment and machinery, capital resource management, use of credit and terms of loans, laws relating to the farms, and crop marketing. These skills are important to the improvement in agricultural productivity projected by the National Cropping Plan. Also important to improved

TABLE II.6

Projected Livestock Numbers by Enterprise



productivity are cooperative activities by the farmers.

In the areas of the smallest farms, some aggregation of individual plots would improve the farming practices. Cooperatives activities are also needed to develop and maintain community irrigation and drainage systems and to control pests and insects. Cooperative acquisition, storage, and maintenance of larger equipment (e.g., tractors, etc.) is desirable in many areas. Cooperative development is recommended for some production facilities such as poultry enterprises. And there are benefits to be derived by the farmers from cooperative marketing of products.

Improved operation of small and medium sized farms will be accelerated if the farmers see the advantages of rural cooperatives and are willing to participate in such community actions. Attitudes towards cooperatives may differ from region to region with different socio-cultural factors and farmers' experiences. There are traditional cooperatives in some areas of Iran [Ref. 6, p. 4] which are organized and operated differently in different regions. These can serve as the basis for increased cooperative activities.

E. CONCLUSIONS

To meet projected demands and become self-sufficient in grains and most basic commodities, Iran's agriculture needs to increase its production by a factor of three in twenty years. Analyses by agricultural experts indicate that this can be achieved with the available resources. The specific changes and improvements that will be needed are identified.

While some of the changes depend on government projects or growth of large commercial operation, the great majority of the changes must come from improved practices by Iran's millions of farmers operating small to

medium sized farms. Individually, the changes recommended are fairly straightforward and do not involve introduction of exotic practices. However, the changes do cover a very wide range of farm activities. In addition, there is variation in the importance of different changes from region to region.

The changes recommended for small and medium sized farms are the basis for developing the content for farmer education programs. In the following chapter this information is organized to define an efficient set of media programs and regional broadcast schedules to help bring about the indicated changes.

CHAPTER III

DERIVATION OF COURSE PRODUCTION INFORMATION

A. INTRODUCTION

Chapter II, drawing from the National Cropping Plan information on Iranian agriculture, restated Iran's agricultural development goals and the role of small and medium sized farms in achieving these goals. The agricultural goals defined the changes in behavior of the farmers and also quantitatively established the increased production to be derived. In this chapter, the desired changes in behavior of the farmers are translated into requirements for instructional and informational media programs.

The work here is aimed at identifying topics to a level of detail where design production teams can take over. It is assumed that course project teams or information program project teams would consist of:

- content specialists in the subject area,
- message designers who define the appropriate mix of media and prepare scripts and text,
- studio and/or film producers to translate scripts into programs, and
- evaluators who will define the mechanism for measuring the effectiveness of materials and improving them.

There are two major guidelines to be used in the development of the course designs. First, the programming must focus on farmer decisions, avoiding all but the absolutely necessary theoretical background material. It is critically important that the farmers in Iran be shown how to take immediate steps to improve their production capabilities. The material presented must be practical, easily understood, and relatively easily applied. Secondly, where the activities required of the farmer go beyond

his normal ability to comprehend and implement new techniques, such as in the use of sophisticated testing of soils, the materials should tell the farmer how he can go about enlisting the help of the local agricultural extension agent to get the necessary activities underway. Both of these guidelines aim toward the development of programming which can be translated by the farmer into immediate improvement in his production.

These guidelines are developed in further detail in the descriptions of specific program content in Sections B and C of this chapter. More general information relating to the farmers' characteristics and to design of effective messages is contained in Section D.

The basic division of programming content is into instructional (Section B) and informational (Section C) categories. The instructional programs have the more sophisticated design and organizational problems. These programs will be mainly responsible for providing the farmer with the specific knowledge needed for him to meet the national agricultural objectives. The informational programs will provide general motivation, describe progress of specific government projects related to local farmers, and provide timely information (e.g., weather, and market conditions) needed by the farmer in day-to-day operations. The following sections first give the detailed information on the instructional programs, then describe in more general terms the informational programs and, finally, give guidelines in production planning.

B. INSTRUCTIONAL PROGRAMS

In this section, the organizational process for the instructional programs is first described. Next, the crops chosen for the first phase

of production are listed and their importance justified with data from the national cropping plan. Finally, the full listing and content description is given for each program.

1. Organization of the Programs

The material to be presented through the media must be organized into a number of specific short broadcasts, each with well defined material and purpose. In the following sections, the term "course" will be used to describe a major topic heading that may have a number of different programs, e.g., "Irrigation." The term "course element" will be used to describe different components of material under one "course" topic, e.g., "Furrow Irrigation," or "Sprinkler Irrigation." Each "course element" will have one or more segments – 15-minute programs – needed to present the material. In organizing the material into "courses" and "course elements," a number of factors have to be taken into account.

- The material in each course element (and, if possible, in each segment) should be self-contained and easily understandable by the farmer. The material presented in any one element should, if possible, not depend heavily on the farmer's having watched previous programs in the course or in other courses.
- The organization must account for the interactions between different kinds of farm activities. For example, farm irrigation activities are related to the soil composition, climate, fertilizer application, and the crop being grown. These relationships must be accounted for in organization of the courses and course elements while minimizing the need for repetition of the same message.
- Unneeded duplication must be eleiminated to keep the amount of programming reasonable for the farmer as well as to

reduce production costs. In general, farm conditions can be described along several dimensions and a course element for a particular activity considered for each combination of conditions. For example, a course element on "Insect Control" might be made for medium-sized irrigated wheat farms. A second element on "Insect Control" might be made for medium-sized rainfed wheat farms; a third for small-sized irrigated wheat farms, etc. Such duplication is not needed if the message on "Insect Control" does not vary with the size of the farm or the form of water availability. On the other hand, a second element would be needed where the content does vary, e.g., between "Insect Control" on wheat crops and on sugar beets. For each message being designed, the right level of repeated programming must be selected. (Note that variation in growing seasons may call for a course element to be broadcast at different times in different regions, but not require a second element to be produced.)

- There are some areas of farmer activities where the information needed is complex and cannot be presented to the farmer through the media. It would be hard for the farmer to grasp and may even mislead him and result in distrust toward other media programs. Such areas should be eliminated from the media courses and course elements, and reference made to the extension services for such information.

- Finally, priorities must be set for including material in courses and course elements. The farmer's ability to listen to and absorb new information and the ability to produce material of good quality is limited. Priorities must be set for the most important crops and the most important changes to be considered. Course elements for the most widely applicable practices and the most important crops should be produced and scheduled for broadcast first.

The above factors provided guidance in organization of the course materials into major topics, "courses," and subdivisions, "course elements." The process of organization consisted of developing a list of topics from the agricultural goals, Chapter II, and expanding the list with the help of agricultural experts (see acknowledgements). Subject area experts in Iran, as well as international consultants, were used for each subject area to define the minimum number of repeated course elements needed to meet the variety of conditions found in Iran.

Overlapping information was identified and reduced to the level necessary. Experts advised in eliminating content that is unnecessary background theory or that is too complex for media presentation; in the latter case, the programs refer the farmer to available advisers. Detailed material was developed for the most important crops (see B.2.) and emphasis put on practices common to most farmers.

The process that was followed was iterative in that at any step of the way experts were able to add new topic areas or to propose simplification of the existing topics. The resulting courses and course elements efficiently cover the important changes for Iran's farmers with specifics for the most important crops. There are ten courses with an average of 11 course elements each. There are approximately 173 15-minute segment, or 43¼ hours of total program production required to cover the material.

The "Farm Management" course is of use to the general farmer for most of his work. It becomes specific only in areas of record keeping for specific activities. Need for community action, cooperatives, is only generally introduced here; more specific community activities are described with the specific activity courses, e.g., irrigation development, machinery acquisition and pest control.

The "Animal Husbandry" courses are thus of interest to almost all traditional farmers. The courses encourage improvement of breeds and better balance of range and pasture use, fodder production, use of crop residue, and animal production.

"Agricultural Machinery" introduces general information important to selection and operation of machinery, including the role of community ownership. It then introduces more specific information for implements used with specific crops.

The courses, "Soils and Soil Conservation," "Water Conservation and Crop Irrigation," "Fertilizer Application," "Weed Control," "Plant Disease," "Pest and Insect Control" are all concerned with activities for raising crops. The first courses on soils and water have many elements that are general information suited to most farmers irrespective of what crop they grow. The courses also have identified specific community activities. Some later elements in these courses are crop specific. The courses on fertilizers and on crop protection have far fewer common elements; most topics have to be produced separately for the different crops because of crop-specific factors.

The final course, "Additional Information for Specific Crops," mainly covers planting, tending, and harvesting activities of the most important crops and improvement of pastures and rangeland.

Each course element is meant to stand alone in its presentation of information. This will allow the elements to be presented on a flexible schedule throughout the year to suit the farmer's time availability and his interest in a particular activity or decision. The best time will vary with the growing season, and crop seed variety of different regions, and thus will call for a variety of broadcast schedules. The design of such schedules is presented in Chapter IV.

2. Selection of Major Crops

Iranian farmers grow many different crops. However, the great majority of production is concentrated in a few major ones. (The distribution of crops is shown in Chapter II, Table II.2). Many of the course elements are not dependent on crop type. There are others, however, that are crop-specific and duplicate courses have to be made for each different crop that is desired to be covered. To keep the initial production needs within reason, a selection of crops must be made for first consideration.

In making this selection, crops have been chosen from each of four major groups:

- field crops,
- forage crops,
- vegetable and garden crops, and
- fruit crops.

For the first phase of production the most important crops in each group have been recommended. In making the selection, a number of factors were considered:

- The number of active farmers involved in producing the crop. (Crops grown mainly by agribusiness were not weighted as heavily as those produced by small and medium sized farms.)
- Planned increase in production in future years. (Crops with projected increases in productivity and acreage received more attention.)
- Forecasted demand. (Crops with largest future demands have highest priority.)
- Integration with livestock feeding. (Crops critical to livestock production receive high priority.)

- Availability of suitable soil conditions throughout Iran.
- Substitutability of crops. (Crops for which there is no substitute received high weight.)

Following these criteria, specific crops were selected for the first phase program development. These crops are:

a. Field Crops

- Wheat
  - Iran's largest crop
  - Produced by over 70% of the farmers
  - 180% increase in production, 1972-1992
  - Highest forecast demand 1992 (7,386,000 tonnes)
  - Currently low productivity per hectare
- Barley
  - Major crop for both animal feed & human consumption
  - Suitable soil in most areas of Iran
  - Produced by most farmers
  - Currently low productivity per hectare
- Sugar Beets
  - Fifth most important crop for human consumption
  - Suitable soil in most areas of Iran
  - 265% increase in production, 1972-1992
  - Forecast demand in 1992 (1,866,000 tonnes)
  - Crop with almost no substitute

b. Forage Crops

- Alfalfa and Clover (leguminous fodders)
  - The major crop for animal feed
  - Critical to crop rotation patterns due to low nitrogen content of Iran's soils and ability of leguminous crops to fix nitrogen.
- Pasture and Rangeland Seeding is also included as critical to livestock production.

c. Vegetable and Garden Crops

- Tomatoes
  - Vegetables are the third highest in consumed foods in Iran. Tomatoes are one of the most important vegetable crops.
  - Tomatoes are sutied to most areas of Iran and are grown in small plots by most farmers.
  - Growing and handling of tomatoes are similar to other vegetable crops (course overlap will be great).

d. Tree Crops

- Fruits and nuts are second highest in consumed foods, after wheat.
- 516% increase in fruit and nut production, 1972-1992
- Forecast demand for fruits and nuts in 1992 (5,311,000 tonnes)

- Apples and Pears
  - Apples and pears are the most important of the deciduous fruits.

There is a second group of crops that are close in importance to those described above. They have been put in the second priority because either their occurrence throughout Iran is less than the first group, or fewer farmers currently grow them, or there is more concentration of agribusiness, or the need for further improvement in productivity is less. These crops include:

- cotton
- pulses
- oil seeds
- rice
- potatoes
- onion

There is a third category of crops of less importance than the crops of the first two categories. These crops are smaller in national production and, for the most part, are grown only in specific areas of Iran. They include:

- maize
- sorghum
- tea
- tobacco
- green vegetables
- pumpkins
- citrus fruits
- melons
- nuts
- pistachios
- dates
- figs
- grapes
- stone fruits

Though course elements have not been added for crops in the second and third categories, the existing material is organized so that inclusion of additional crops is straightforward. To add another crop, specific course elements would be designed for planting and harvesting, and weed, pest and disease control. Some added information may be needed in fertilizer and irrigation, although most information in these topics is already included in the existing course elements.

To add a crop to the first phase courses would require from four to six course elements, about 75 minutes of production. The course schedules presented in this chapter have sufficient space for including additional crop-specific courses as long as only those crops that are important to each region are broadcast. The detailed list of major crops for each region is given in Chapter IV, Section H.

2. Program Content

The detailed course content is given in the following pages. For each course, an introduction describes the main purpose and gives guidance as to the emphasis and tone of the course elements. Next is a list of the course elements summarizing the projected program time for each element. Following that, each course element is listed and described.

The course element information is presented with the following format:

X1 — TITLE OF COURSE ELEMENT

a. Subheading (not always used)

- Content description.
  - additional information
  - additional information

- Content description.

\- - - (The dashed line indicates division of information into 15-minute segments. Not used for most courses.)

b. Subheading

- Content description. ("Same as (a) . . ." used when the description of material in a course element is the same as a description already given.)

Time: Number of 15-minute Segments *#
Broadcast: Early _____, Late _____
or _____; repeat_____

*Broadcasting time of course varies with region.

#Government Project related course.

"Time" indicates that the material described above is to be contained in a certain number of 15-minute segments. When separate subheadings, (a), (b), are given, separate time estimates are given for each subheading.

"Broadcast" indicates the general time of year when the material should be broadcast. If there are two different seasons when the material is needed, this is indicated by "_____; repeat _____." This information does not indicate how many times within the specified season the element should be broadcast to best reach the farmer.

The symbol (*) in the box around the broadcast time is used to indicate that the best broadcast time of the course varies from region to region in Iran. Where this is the case, the proper broadcast times should be defined using the procedures described in Chapter IV, Section F.

The symbol (#) in the box around the broadcast time is used to indicate that introduction of the course to a broadcast schedule can be related to progress in government projects or availability of specific resources (see Chapter IV, Section G).

The list of courses and the estimated total production time of each is given on the next page.

LIST OF COURSES

TOPIC	PRODUCTION TIME (hours)
(A) Farm Management	3.5
(B) Animal Husbandry	17.25
(C) Agricultural Machinery	4.25
(D) Soils and Soil Conservation	2.0
(E) Water Conservation and Crop Irrigation	3.0
(F) Fertilizer Application	2.75
(G) Weed Control	1.75
(H) Plant Disease	1.50
(I) Pest and Insect Control	2.25
(J) Additional Information for Specific Crops	4.5
TOTAL HOURS OF PRODUCTION TIME	43.25

(A) FARM MANAGEMENT

1. Introduction

Farm management is an area that agricultural extension services have underemphasized in relation to other farm problems. As yet, there is no question that practices such as record keeping, budgeting, organization, crop selection and marketing are essential to agricultural efficiency. The small farmers are at one time producers, consumers, purchasers, and usually marketers of their produce. They have a great need for farm management skills.

Full farm management skills would include capabilities in eight different areas:

- Selection of optimum mix of products (crops, livestock), quantity of products, and inputs (water, fertilizer, labor, etc.).
- Farm budgeting for total budget allocation and incremental cost-price decision making.
- The economics of livestock on the farm and its planning and organization.
- Credit availability and applications procedures.
- Basic farm record keeping.
- Organization and maintenance of farm lands and buildings.
- Factors effecting prices of crops and inputs (fertilizers, seet, etc.).
- Marketing the crops and purchasing inputs.

A detailed treatment of each of these areas would be beyond the understanding of the typical small farmer. Therefore, the courses should treat only the most important topic in each area and try to make those points as comprehensive as possible. Highest priority should be placed

on general marketing, credit availability, and basic record keeping.

As a group, the courses should introduce the farmer to systematic decision making: define the decisions in relation to production requirements, define resources, identify possible solutions, choose best alternative. This general theme should be part of most of the course elements.

2. Course Elements: Farm Management

The course elements for Farm Management are as follows:

Course Number	Time (minutes)	Topic
A1	60	Principles of Farm Management
A2	30	Availability of Credit
A3	30	Basic Farm Record Keeping
A4	45	Management of Resources
A5	45	Marketing and Purchase of Inputs
	210 min. = 3.5 hrs.	

A1 — PRINCIPLES OF FARM ORGANIZATION

- Choosing the kinds of crops to produce.
- Comparing the cost of production with gross return.

- The amount and kinds of livestock in proportion to size of farm, environmental and economic considerations.

- Determining the variety of crops to grow with regard to equipment and resources available.

- How much seed to plant per unit area and what amount of fertilizer to apply.
- Expenditure for buildings, machinery, etc. in proportion to size of farm.

Time: 4 x 15-minute segments
Broadcast: Spring, Fall, Winter

A2 — AVAILABILITY OF CREDIT AND RENTAL

- Kinds of credit and kinds of credit institutions.
- Where and when credit is available.
- Conditions for obtaining credit.

- How one should proceed.
- How the application could be filled out.
- Who can provide advice.

Time: 2 x 15-minute segments	#
Broadcast: Fall and Winter	

Government Project related course.

A3 — BASIC FARM RECORD KEEPING

- Basic farm bookkeeping:
  - Kinds of accounts to keep;
  - Methods of keeping accounts.

- Special Records:
  - Crop records of special fields;
  - Records for crop rotation;
  - Records for livestock production.

Time: 2 x 15-minute segments Broadcast: Fall

A4 — MANAGEMENT OF RESOURCES

- Improvements, buildings, roads, trees, ground, etc.
- Planning maintenance, repair, and construction; scheduling use of equipment.

- Effective use of animal and machine power in different operations.
- Planning cultivation with regard to availability of equipment.

- Effective use of slack time.
- Labor management

Time: 3 x 15-minute segments Broadcast: Fall, Winter

A5 — MARKETING AND INPUT PURCHASE

- How to market; when to market.
- Processing to prepare crops for market.

- Finding different agents for selling crops.
- Advantages and disadvantages of bartering.

- What to do with cash.
- Availability of transportation and storage.

Time:	3 x 15-minute segments
Broadcast:	Summer and Fall

(B) ANIMAL HUSBANDRY

1. Introduction

One of Iran's most important agricultural problems is a poor balance between range land use, crop production, and livestock production. There is overgrazing and deterioration of range land, lagging fodder production, shortages of winter feed for livestock, and increasing wind and rain erosion of suitable agricultural lands. To reduce deterioration of the agricultural resources, long-range national and regional plans need to define goals of future pasture and animal production that are consistent with Iran's agricultural resources and population growth. To achieve these goals, the farmers need to improve the efficiency of their livestock production and at the same time change the balance between raising livestock and raising foods for direct consumption.

The television courses directed at the small farmers will be mainly concerned with the efficiency of livestock production. The courses should not attempt to directly effect the national or regional balance of crop and livestock production. This balance should be carefully planned and then implemented by national and regional experts through effects on resources available to the farmers, modifying markets for different farm products, and other such measures. Courses should support these actions by directing farmers to the available information and resources and by describing the importance of markets in determining how much livestock to raise.

The Animal Husbandry courses are divided into two major categories: (1) livestock (cattle, sheep, and goats); (2) poultry. The individual course topics for each category are listed below.

2. Course Topics: Animal Husbandry

The course topics in Animal Husbandry are as follows:

Course Number	Production Time (minutes)	Topic
(1) Livestock (cattle, sheep and goats)		
B1	30	Animals and Their Economic Benefit
B2	90	Food Availability
B3	30	Livestock Housing
B4	120	Proper Feeding of Livestock
B5	15	Nutrition and Reproduction
B6	75	Selection of Breeding Animals
B7	60	Breeding Types
B8	30	Artificial Insemination
B9	60	Care of Lambs and Calves
B10	60	Meat Production
B11	30	Marketing of Livestock
B12	90	Milk Production and Handling of the Milk
B13	120	Management of Infectious Disease and Disease Prevention
B14	60	Animal Producers Organization in Villages
B15	30	Carpet Wool Production
Subtotal	900 min. = 15 hrs.	

Course Number	Production Time (minutes)	Topic
(2) Poultry		
B16	10	Poultry and Their Economic Benefit
B17	10	Poultry Farm and Feeding
B18	10	Poultry Houses
B19	10	Types and Breeds of Poultry
B20	10	Incubation, Natural and Artificial
B21	5	Brooding, Natural and Artificial
B22	10	Care of Young Chickens
B23	10	Egg Production
B24	15	Sanitation and Disease Prevention
B25	15	Marketing of Poultry and Eggs
B26	30	Poultry Producers Organization in Villages
Subtotal	135 min. = 2.25 hrs.	
TOTAL	1035 min. = 17.25 hrs. PRODUCTION TIME	

B1 — ANIMALS AND THEIR ECONOMIC BENEFIT

- Animals to convert plant materials to foods for human consumption.
- Value of livestock on the farm (milk, meat, fertilizer).

- How the number and types of livestock on the farm depend upon the quantity and quality of pasture, water, irrigation, fields, rainfall and soil.

Time:	2 x 15-minute segment
Broadcast:	Fall, Winter

B2 — FEED AVAILABILITY

- Village pasture development for feeding.
- Conservation of grass, fodder, and silage for winter feeding.
- How to create silage and when to create silage in relation to hay harvest.

Time:	6 x 15-minute segments
Broadcast:	Spring and Summer

B3 — LIVESTOCK HOUSING

- Demonstration of sanitary but simple housing which can be built with materials available in the villages.

Time:	2 x 15-minute segments
Broadcast:	Early Winter

B4 — PROPER FEEDING OF LIVESTOCK

(a) Cattle

- Local feed in the village.
- Feeding before mating and after calving.
- Classification of local feeds according to bulk, method of harvesting and composition.
- Function of these local feeds and their digestibility.
- Crop residue for feed.
- Classification of residue in terms of animal nutrition, digestibility.
- Methods of ration showing in terms of animals food requirements.
- How to feed and establish sanitary watering places.
- Benefits of proper feeding.

(b) Sheep and Goats

- Content same as (a) above.

Time:	(a)	4 x 15-minute segments
	(b)	4 x 15-minute segments
Broadcast:	Early Winter, Late Fall	

B5 — NUTRITION AND REPRODUCTION

- How nutrition of livestock can affect their reproduction.

Time:	1 x 15-minute segment
Broadcast:	Late Summer

B6 — SELECTION OF BREEDING ANIMALS

(a) Cattle

- Selection of high producers in herd.
- Use of high quality sires; names of stations where such sires can be obtained.
- Segregating and feeding of young males not selected for breeding.
- Elimination of young females which do not conceive.
- Elimination of old females which do not reproduce.
- Production evaluation and basic record keeping.

(b) Sheep and Goats

- Content same as (a), above, plus
- Downgrade "fat tail" as factor in selecting breeders.

Time:	(a) 2 x 15-minute segments	*
	(b) 2 x 15-minute segments	
Broadcast:	Summer	

* Broadcasting time of course varies with region.

B7 — BREEDING TYPES

(a) Cattle

- Local breeds of beef cattle, and dairy cattle, with their breeding characteristics.
- Points in judging cattle for breeding.
- In-breeding and cross-breeding.

(b) Sheep and Goats

- Content same as (a) above.

Time: (a) 2 x 15-minute segments (b) 2 x 15-minute segments	*
Broadcast: Winter	

* Broadcasting time of course varies with region.

B8 — ARTIFICIAL INSEMINATION

- The action of the farmer for artificial insemination.

Time: 2 x 15-minute segment	#
Broadcast: Winter	

Government Project related course.

B9 — CARE OF LAMBS AND CALVES

(a) Cattle

- Care and handling of calves, and how they should be fed.
- Some preliminary actions for health control.

(b) Sheep and Goats

- Content same as (a) above.

Time:	(a)	2 x 15-minute segments	*
	(b)	2 x 15-minute segments	
Broadcast:	Early Spring		

* Broadcast time of course varies with region.

B10 — MEAT PRODUCTION

(a) Cattle

Custom feeding for marketing.

Points in judging animals for meat production.

Aim in feeding meat animals as compared with that in feeding dairy animals (i.e., Varmin-Garmsar meat production).

(b) Sheep and Goats

Content the same as (a) above.

Time:	(a)	2 x 15-minute segments
	(b)	2 x 15-minute segments
Broadcast:	Spring	

B11 — MARKETING OF LIVESTOCK

- Animal costs and price in relation to age and quality of livestock
- Cost and consequent result of holding animals.
- When animals should be brought to market with regard to government policy.
- Marketing of old and poor producer livestock.

Time: 2 x 15-minute segments	#
Broadcast: Winter	

Government Project related course.

B12 — MILK PRODUCTION AND HANDLING OF THE MILK

(a) Cattle

- Feeding for high milk production.
- Improvement of milking qualities of dairy animals.
- How the proper milking procedure should take place.
- Milk hygiene and processing.
- Improved handling of cheese, butter, and ghee.

(b) Sheep and Goats

- Content same as (a) above.

Time: (a) 3 x 15-minute segments	*
(b) 3 x 15-minute segments	
Broadcast: Spring and Summer	

* Broadcast time of course varies with region.

B13 — MANAGEMENT OF INFECTIOUS DISEASE AND DISEASE PREVENTION

- Services available from the Extension Services Veterinary Department, and how to contact them.
- Several important diseases of the regions and the needed action for prevention or cure through vaccination, dipping and other treatment.
- Reporting the behaviour of sick animals.
- Additional actions on the part of the farmer.
- Necessary action when a disease breaks out in a region.

Time: 8 x 15-minute segments	#
Broadcast: Summer, Spring, Winter	

Government Project related course.

B14 — ANIMAL PRODUCERS ORGANIZATION IN VILLAGES

- Livestock cooperatives (e.g., Varamin-Garmsar) and the benefits they provide to the animal producer.
- How extension services could help in forming an organization.

Time: 2 x 15-minute segments	#
Broadcast: Winter	

Government Project related course.

B15 — CARPET WOOL PRODUCTION

- Quality of wool.
- Improving the quality and quantity.
- Use of improved rams for carpet wool.
- Where to get good carpet type rams.
- Use of different wool for different purposes.
- Marketing standards of wool.

Time: 2 x 15-minute segments
Broadcast: Winter

B16 — POULTRY AND THEIR ECONOMIC BENEFIT

- Value of poultry on the farm.
- Feed demand.
- Use of by-products on the farm.
- Use of poultry manure.

Time: 1 x 10-minute segment Broadcast: Summer

B17 — POULTRY FARM AND FEEDING

- Why poultry on farm.
- Types of poultry suited for farm.
- Feeding birds for meet and eggs.
- Use of crop residue.

Time: 1 x 10-minute segment Broadcast: Summer

B18 — POULTRY HOUSES

- Construction of various types of poultry houses.
- Essentials of good poultry houses (equipment, space, temperature, light).

Time: 1 x 10-minute segment
Broadcast: Summer

B19 — TYPES AND BREEDS OF POULTRY

- Meat type, characteristics and breeds.
- Egg type, characteristics and breeds.
- General purpose types, breeds, farm poultry.

Time: 1 x 10-minute segment	*
Broadcast: Fall	

* Broadcast time of course varies with region.

B20 — INCUBATION, NATURAL AND ARTIFICIAL

- Selection of eggs.
- Setting facilities for natural incubation.
- Development of various artificial incubation methods.
- Types of modern machines.
- Specific factors in artificial incubation (temperature, ventilation, moisture, manipulation of egg, etc.).

Time: 1 x 10-minute segment	*
Broadcast: Fall	

B21 — BROODING, NATURAL AND ARTIFICIAL

- Brooders, natural and artificial; essential factors in management.

Time: 1 x 5-minute segment	*
Broadcast: Summer	

* Broadcast time of courses varies with region.

B22 — CARE OF YOUNG CHICKENS

- Feeding, management and general care of young and growing chickens.

Time: 1 x 10-minute segment Broadcast: Summer

B23 — EGG PRODUCTION

- Selection of stock
- Feeding
- Building design
- Culling

Time: 1 x 10-minute segment Broadcast: Summer

B24 — SANITATION AND DISEASE PREVENTION

- Access to air, water, feed, protection, and clean facilities.
- Minimizing poultry movement in the village.
- Identification of common diseases of hens and chickens.
- The prevention and treatment of diseases.
- Fly and parasite control.

Time: 1 x 15-minute segment
Broadcast: Summer

B25 — MARKETING OF POULTRY AND EGGS

- Period of marketing.
- Storage of eggs.
- How and where to market.
- Sizing, packing and factors of grading eggs.

Time: 1 x 15-minute segment
Broadcast: Late Summer

B26 — POULTRY PRODUCERS ORGANIZATION IN VILLAGES

- Benefits of poultry production.
- What resources and credit are available.
- How to proceed.
- Available sources of service, information and advice.

Time: 2 x 15-minute segments	#
Broadcast: Summer	

Government Project related course.

(C) AGRICULTURAL MACHINERY

1. Introduction

Selecting appropriate farm machinery is not easy, even with a history of experience. It is even more difficult when neither the supplier nor the purchaser has experience with mechanization under local conditions, as is the case in most developing countries. For most crops, the variety of machines available from the world's manufacturers is even greater than the range of soil and climate conditions; there is a wide range of models and prices. There is usually little clear relationship between the field and performance efficiency of the machines and their price; an inexpensive machine may cost more to operate than one which originally costs more.

The purchase of a tractor or other farm equipment represents a major investment by a farmer or group of farmers. Wrong decisions will affect not only the individual farmers, but also overall productivity and the national economy. The factors that must be taken into account in selecting the machinery include crop type, soil conditions, and farm size. In addition, socio-economic factors relating to supply and cost of labor and credit availability determine the most appropriate level of mechanization in moving from traditional to more heavily capitalized agriculture. Finally, the support services for the equipment must be considered; equipment cannot be kept operating without a distribution network for spare parts, service facilities, and training facilities for operation and maintenance.

Because these factors are complex and will vary from region to region, the courses should direct the farmers to local agricultural extension agents and agricultural credit banks for consultation. Here they

should obtain information and help in making decision on what machinery is most appropriate to their operation.

The following courses on specific machines (C3 through C9) should emphasize proper operation, maintenance and storage of the equipment, both in active and inactive seasons. They should also cover selection of appropriate machinery for the conditions, but always include advice to consult local experts. Where specific equipment must be used in the course for illustration, the most common type in use should be selected.

2. Course Topics: Agricultural Machinery

The course topics in Agricultural Machinery are listed below.

Course Number	Production Time (minutes)	Topic
C1	15	Benefit and Cost of Machines for Different Farmers
C2	30	Community Cooperation for Equipment Use
C3	15	Preliminary Tillage
C4	15	Secondary Tillage
C5	15	Planting a Crop Establishment
C6	15	Cultural Practices
C7	15	Harvesting
C8	15	Processing, Storage and Handling
C9	15	Applications for Small Engines
C10	30	Tractor Service after 50 Hours
C11	30	Tractor Service after 100 Hours
C12	30	Tractor Service after 250 Hours
C13	15	Tractor Service after 500 Hours

Course Number	Production Time (minutes)	Topic
C14	15	Annual Tractor Service
C15	15	Spare Parts and Tools

C1 — BENEFIT AND COST OF MACHINES FOR DIFFERENT FARMERS

- Economic advantages and disadvantages of agricultural machines for different types of farm systems.
- Relationship between use of labor and use of machines.
- Advantages of machines in peak farm activity; abiiity to double crop.

Time: 1 x 15-minute segment
Broadcast: Fall

C2 — COMMUNITY COOPERATION FOR EQUIPMENT USE

- Benefits of cooperation.
- How to get resources and credit.
- How to plan storage sites, service, etc.
- Where to obtain advice.

Time: 2 x 15-minute segments	#
Broadcast: Winter	

Government Project related course.

Courses C3 through C9 should cover operation, maintenance and storage of equipment. They should also cover selection, but include advice to contact local advisors.

C3 — PRELIMINARY TILLAGE

- Plows
- Sub-soilers
- Chisels

Time: 1 x 15-minute segment	*
Broadcast: Late Winter, Late Summer	

C4 — SECONDARY TILLAGE

- Disks
- Rollers
- Harrows
- Bed Shapers, incorporation of chemicals.

Time: 1 x 15-minute segment	*
Broadcast: Winter, Summer	

* Broadcast time of courses varies with region.

C5 — PLANTING OR CROP ESTABLISHMENT

- Grain Drills
- Vegetable Planters

Time: 1 x 15-minute segment	*
Broadcast: Early Spring	

C6 — CULTURAL PRACTICES

- Fertilizer Applicators
- Sprayers and Dusters
- Cultivators

Time: 1 x 15-minute segment	*
Broadcast: Late Spring	

* Broadcast time of courses varies with region.

C7 — HARVESTING

- Harvesting machines for different crops.
- Windrower for grain and forage.

Time: 1 x 15-minute segment	*
Broadcast: Late Summer	

C8 — PROCESSING, STORAGE AND HANDLING

- Grinders and Mixers of Animal Feeds
- Pumps and Conveyors

Time: 1 x 15-minute segment	*
Broadcast: Fall	

* Broadcast time of courses varies with region.

C9 — APPLICATIONS FOR SMALL ENGINES

- Various applications of small engines on the farm.

Time: 1 x 15-minute segment Broadcast: Fall

C10 — TRACTOR SERVICE AFTER 50 HOURS WORK

- Maintaining the battery.
- Checking and adjusting V-belt tension.
- Lubricating the clutch-release mechanism.
- Maintaining the hydraulic system level.
- Servicing the air cleaner.
- Checking and servicing other parts of the tractor.

Time: 2 x 15-minute segments Broadcast: Spring

C11 — TRACTOR SERVICE AFTER 100 HOURS WORK

- Changing crankcase oil.
- Replacing the oil filter.
- Servicing the crankcase breather.
- Maintaining tractor tires.

  Checking and servicing other parts of the tractor.

Time: 2 x 15-minute segments
Broadcast: Spring

C12 — TRACTOR SERVICE AFTER 250 HOURS WORK

- Making valve-clearance adjustment.
- *. Maintaining tractor sparkplugs.
- *. Cleaning the battery.
- *. Cleaning the sediment bowl and filter.
- Adjusting the carburetor.
- Adjusting the brakes.
- Adjusting the engine clutch.
- Checking and servicing other parts of the tractor.

NOTE: Those with (*) could be managed by the farmer. It should be recommended that the remainder of the actions should be accomplished by a trained person.

Time: 2 x 15-minute segments
Broadcast: Summer

C13 — TRACTOR SERVICE AFTER 500 HOURS WORK

- Servicing the Distributor.
- Timing the Ignition.
- Maintaining the starter and generator.
- *. Servicing dual-engine fuel filters.
- Servicing front-wheel bearings.
- *. Maintaining the cooling system.
- Checking and servicing other parts of the tractor.

NOTE: Those with (*) can be managed by the farmer.

Time: 1 x 15-minute segment Broadcast: Fall

C14 — ANNUAL TRACTOR SERVICE

*• Cleaning the Tractor.

*• Servicing the oil bath, air-cleaner assembly.

• Servicing the drive mechanism.

• Servicing the hydraulic system.

• Adjusting the engine governor.

*• Preparing the tractor for storage.

NOTE: Those with (*) can be managed by the farmer.

Time: 1 x 15-minute segment
Broadcast: Late Fall

C15 — SPARE PARTS AND TOOLS

- Set of common and most-needed tools to have at the farm.
- Spare parts for most common failures.

Time: 1 x 15-minute segment
Broadcast: Fall

(D) SOILS AND SOIL CONSERVATION

1. Introduction

If efficiently managed, Iran's arable land can be made to yield most of the food products needed by the population. This will require proper preparation, use and protection of the land. Courses D, E, and F are concerned with the soil, its irrigation, and use of fertilizers to increase its yields. The most important factors affecting soil productivity are:

- Proper and timely preparation of the seedbed and proper density, spacing, and depth of the seeds.
- Maintenance of soil structure and composition through crop selection and crop rotation.
- Supply of moisture and proper drainage.

The course, "Soils and Soil Conservation," should introduce the basic techniques needed for efficient soil management and describes their relationship to farm productivity. The more complicated relationships cannot be handled through a media course; for this information, farmers should be referred to local experts.

2. Course Topics: Soils and Soil Conservation

The course topics in Soils and Soil Conservation are as listed below:

Course Number	Production Time (minutes)	Topic
D1	15	Available Soil Service Institute
D2	15	Plant Response to Growth
D3	15	Management of Soil

Course Number	Production Time (minutes)	Topic
D4	30	Tillage Operation
D5	15	Planting in Cold Spring
D6	15	Reducing Soil Erosion
D7	15	Crop Rotation
TOTAL PRODUCTION TIME	120 min. = 2 hrs.	

D1 — AVAILABLE SOIL SERVICE INSTITUTE

- Introduction of Soil Institute and its major responsibility.
- Location of Soil Institute in different areas.
- How to get information and service from the Soil Institute.
- Basic actions for soil testing.

Time: 1 x 15-minute segment	#
Broadcast: Summer, Winter	

Government Project related course.

D2 — PLANT RESPONSE TO GROWTH

- Environmental needs, such as light, air, temperature.
- Food needs, such as nutrients in soil and water.
- Lack of iron in orchard trees, lack of nutrients in crops, and how it affects the plants.
- Lack of, or presence of, some plant nutrients upon animal health.

Time: 1 x 15-minute segment
Broadcast: Early Winter

D3 — MANAGEMENT OF SOIL

- Water, aeration and tillage problems (hard-pan formation).
- Infiltration; when to till.
- Keeping land from becoming either too packed or too loose.

Time: 1 x 15-minute segment
Broadcast: Winter

D4 — TILLAGE OPERATIONS

- Work necessary to prepare seedbeds properly.
- Need to plow most soils in the Fall to eliminate Spring pre-planting operations.
- Cultivation for weed control and to break surface crusts.
- Need to plow organic matter under as often as possible.
- Disking and chiselling for aeration of soil.

Time: 2 x 15-minute segments *
Broadcast: Late Winter

* Broadcast time of course varies with region.

D5 — PLANTING IN COLD SPRING

- Importance of temperature in seed germination.
- Causes of slow warming (mulches and moisture).
- Methods of speeding warming (drainage, clear plastic, mulches, etc.).
- Living with temperature.
- Planting under plastic cover.

Time: 1 x 15-minute segment	*
Broadcast: Winter	

* Broadcast time varies with region.

D6 — REDUCING SOIL EROSION

- Plant cover (permanent grass, plant rotation, minimum tillage).
- Contouring (planting, tillage, rotation).
- Barriers (vegetation, slopes, dams).

Time: 1 x 15-minute segment
Broadcast: Late Winter

D7 — CROP ROTATION

- Why crop rotation is needed.
- Physical effects of crop rotation.
- Effects of crop rotation on plant food, weed control.
- Effects of crop rotation on insects, plant diseases.
- Ways in which plant food is lost (cropping, erosion, and leaching).
- Importance of planting peas, beans, clovers and alfalfa in rainfed areas.

Time: 1 x 15-minute segment *
Broadcast: Early Fall, Late Winter

* Broadcast time of course varies with region.

(E) WATER CONSERVATION AND CROP IRRIGATION

1. Introduction

Production practices for farms under irrigation are more complicated than for those under rain-fed agriculture. The intensification of crops requires new skills on the part of the farmer to obtain maximum productivity. Factors which affect irrigation practices include soil type, climate and crop water needs, drainage and salinity, water distribution and network operation. The following courses should introduce the farmers to the most important information to improve their use of irrigation.

The irrigation practices vary significantly for different groups of crops. Therefore, following a general introduction, specific course elements are presented for selected crops. A final group of course elements is concerned with community development and maintenance of the irrigation system and long-term management of soil salinity.

2. Course Elements: Water Conservation and Crop Irrigation

The course elements for Water Conservation and Crop Irrigation are as follows:

Course Number	Production Time (minutes)	Topic
E1	30	Irrigation in Relation to Soils and Plants
E2	15	Selection of Different Types of Irrigation for Different Crops
E3	15	Basic Irrigation (grain, leguminous fodder, deciduous fruits)

Course Number	Production Time (minutes)	Topic
E4	15	Furrow Irrigation (sugar beets, tomatoes, deciduous fruits)
E5	15	Sprinkler Irrigation (grain, sugar beets, leguminous fodder, tomatoes, decid. fruits)
E6	15	Drip Irrigation (mainly deciduous fruits)
E7	15	Community Cooperation and Planning for Ditch Construction and Water Flow to the Fields
E8	15	Community Cooperation for Drainage Systems
E9	30	Salinity Control Through Water Management
E10	15	Land Leveling
TOTAL PRODUCTION TIME	180 min. = 3 hrs.	

E1 — IRRIGATION IN RELATION TO SOILS AND PLANTS

- Need of plants for water.
- Irrigation for fertile land with inadequate rainfall.
- Increased crop production.
- Supply of water (ground, spring, runoff, etc.)
- The soil as a reservoir for water.

- Managing the soil reservoir:
  - soil moisture,
  - amount of water to apply to each soil type,
  - infiltration rates,
  - frequency of filling.
- How much to irrigate.
- When to irrigate.
- Proper actions with limited water supply.
- How to measure moisture content.
- Water quality.

Time: 2 x 15-minute segments
Broadcast: Late Spring, Early Summer

E2 —— SELECTION OF DIFFERENT TYPES OF IRRIGATION FOR DIFFERENT CROPS

- Description of advantages and disadvantages of different types of irrigation for different crops.
  - Basin irrigation
  - Furrow irrigation
  - Sprinkler irrigation
  - Drip irrigation

Time: 1 x 15-minute segment
Broadcast: Early Spring

E3 — BASIN IRRIGATION (Grain, Alfalfa, Deciduous Fruits)

- Consumption of water by the crop.
- Fitting the cropping pattern to availability of water.
- Major considerations of basin irrigation.

Time: 1 x 15-minute segment	*
Broadcast: Fall; repeat in Late Spring	

E4 — FURROW IRRIGATION (Sugar Beets, Tomatoes, Deciduous Fruits)

- Consumption of water by the crop.
- Fitting the cropping pattern to availability of water.
- Major considerations of furrow irrigation.

Time: 1 x 15-minute segment	*
Broadcast: Late Spring; repeat Early Sum.	

* Broadcast time of courses varies with region.

E5 — SPRINKLER IRRIGATION (All Crops)

- Consumption of water by the crop.
- Fitting the cropping pattern to availability of water.
- Major considerations of sprinkler irrigation.

Time: 1 x 15-minute segment	*#
Broadcast: Late Spring; repeat Summer	

E6 — DRIP IRRIGATION (Mainly Deciduous Fruits)

- Consumption of water by the crop.
- Fitting the cropping pattern to availability of water.
- Major considerations of drip irrigation.

Time: 1 x 15-minute segment	*#
Broadcast: Late Spring; repeat Summer	

* Broadcast time of courses varies with region
\# Government Project related courses.

E7 — COMMUNITY COOPERATION AND PLANNING FOR DITCH CONSTRUCTION AND WATER FLOW TO THE FIELD

- How to construct ditches with available service and materials.
- Operation and control of farm and district ditches (where appropriate) and farm water storage or ground water use.
- Maintenance of irrigation ditches and control structures, pumps, equipment, etc.
- Land leveling and grading for different types of land.

Time: 1 x 15-minute segment #
Broadcast: Summer; repeat Winter

Government Project related course.

E8 — COMMUNITY COOPERATION FOR DRAINAGE SYSTEMS

- How drainage occurs.
- Harmful effects of insufficient drainage (lack of oxygen, salinity buildup, etc.).
- Construction and maintenance of drainage systems.
- Specific solutions: tile, dikes, ditches, etc.

Time: 1 x 15-minute segment
Broadcast: Fall; repeat Winter

E9 — SALINITY CONTROL THROUGH WATER MANAGEMENT

- Why salinity builds up, and what is the damage.
- Control measures, such as leaching, etc.
- Methods of irrigation and agricultural practices to control salinity.
- Choice of crops with regard to degree of salinity.

Time: 2 x 15-minute segments	#
Broadcast: Summer; repeat Winter	

E10 — LAND LEVELING

- Purpose of land leveling.
- Where leveling is needed.
- How to level different kinds of fields.

Time: 1 x 15-minute segment	#
Broadcast: Early Spring; repeat Winter	

Government Project related courses.

(F) FERTILIZER APPLICATION

1. Introduction

Fertilizer application with different crops should vary with soil conditions, availability of water, type of irrigation and individual farm practices. For this reason, no general recommendation for fertilizer application can be given for all farms. However, the basic actions needed can be explained to the farmers and the farmer can be made aware of the advantages and disadvantages of using different approaches. This information should be presented to increase the farmer's understanding and to interest him in getting more information and specific advice from the local agricultural extension officer. The courses should be scheduled to remind him of the needed action shortly before it is needed.

The course elements should describe fertilizing of major crops for several common farm conditions. Nitrogen fertilizers should be most emphasized since Iran's soils are most lacking in this element, especially in rainfed areas. Nitrogen deficiency causes slow crop growth, low yields, and poor quality for most crops and thus crops needing less nitrogen, e.g., alfalfa and clover are normally recommended for such areas. The Fertilizer Application course should familiarize the farmers with such information and direct them to farm advisers.

2. Course Elements: Fertilizer Application

The course elements for Fertilizer Application are as follows:

Course Number	Production Time (minutes)	Topic
F1	15	Plant Nutrition
F2	15	The Importance of Maintaining Organic Matter

Course Number	Production Time (minutes)	Topic
F3	30	Nitrogen Fertilizer (Urea)
F4	15	P, K, S Fertilizer
F5	15	Wheat and Barley Fertilizing
F6	15	Sugar Beet Fertilizing
F7	15	Leguminous Fodder Fertilizing
F8	15	Vegetable Fertilizing (Tomato)
F9	15	Deciduous Tree Fertilizing
F10	15	Storage of Fertilizers
TOTAL PRODUCTION TIME	165 min. = 2.75 hrs.	

F1 — PLANT NUTRITION

- List of nutrients.
- Nutrients needed as a function of the crop just grown and the crop to be planted.
- Sources of nutrients (organic, exchangable, etc.).
- Effect on soil condition (pH, living, organic matter, temperature.

Time: 1 x 15-minute segment
Broadcast: Late Summer; repeat Late Winter

F2 — THE IMPORTANCE OF MAINTAINING ORGANIC MATTER

- Nutrient Source (potassium, nitrogen, phosphorus, sulpher, zinc, boron) in organic matter.
- Maintenance of soil structure.
- Benefits as mulch.
- Problems of excess woody material.
- Water penetration and capacity to hold soil moisture.

Time: 1 x 15-minute segment
Broadcast: Late Summer; repeat Late Winter

F3 — NITROGEN FERTILIZER (Urea)

- Sources and their differences (mobility, losses and how to deal with them, efficiency of recovery by crop of what is applied – goal of 50% for field crops, 25% on orchards and vegetables – availability, costs, special apparatus)
- Methods of application (broadcasting, drilling, spraying, placing with the seed, applied in water).
- Amounts needed; cost versus profit.
- Identification of nitrogen deficiency.
- Mixing.

Time: 2 x 15-minute segments	#
Broadcast: Early Fall, Late Winter	

F4 — P, K, S FERTILIZER

- Sources and their differences (mobility, efficiency – placement near seed for the more immobile nutrients, P, K –, availability, costs, special apparatus).
- Methods of application (broadcasting, drilling, spraying, placing with the seed, applied in water).
- Amounts needed; cost versus profit.
- Identification of nitrogen deficiency.
- Mixing.

Time: 1 x 15-minute segment	#
Broadcast: Early Fall, Late Winter	

Government Project related course.

F5 — WHEAT AND BARLEY FERTILIZING

- The major content of each available fertilizer with regard to plant nutrients.
- How to choose fertilizer in relation to soil characteristics, weather, rainfall and plant type.
- How much to apply, when to apply and how to apply (refer farmer to Extension Offices).
- How fertilizer should be used with crop rotation.

Time: 1 x 15-minute segment	*#
Broadcast: Early Fall	

F6 — SUGAR BEET FERTILIZING

- The major content of each available fertilizer with regard to plant nutrients.
- How to choose fertilizer in relation to soil characteristics, weather, rainfall and plant type.
- How much to apply, when to apply and how to apply (refer farmer to Extension Offices).
- How fertilizer should be used with crop rotation.

Time: 1 x 15-minute segment	*#
Broadcast: Early Spring	

* Broadcast time of course varies with region.
\# Government Project related courses.

F7 — LEGUMINOUS FODDER FERTILIZING

- The major content of each available fertilizer with regard to plant nutrients.
- How to choose fertilizer in relation to soil characteristics, weather, rainfall, and plant type.
- How much fertilizer to apply, when to apply, and how to apply (refer farmer to Extension Offices).
- How fertilizer should be used with crop rotation.

Time: 1 x 15-minute segment	*#
Broadcast: Early Spring	

F8 — VEGETABLE FERTILIZING (Tomatoes)

- The major content of each available fertilizer with regard to plant nutrients.
- How to choose fertilizer in relation to soil characteristics, weather, rainfall and plant type.
- How much to apply, when to apply and how to apply (refer farmer to Extension Offices).
- How fertilizer should be used with crop rotation.

Time: 1 x 15-minute segment	*#
Broadcast: Summer	

* Broadcast time of courses varies with region.
\# Government Project related courses.

F9 — DECIDUOUS TREE FERTILIZING

- The major content of each available fertilizer with regard to plant nutrients.
- How to choose fertilizer in relation to soil characteristics, weather, rainfall and plant type.
- How much to apply, when to apply and how to apply (refer farmer to Extension Offices).
- How fertilizer should be used with crop rotation.

Time: 1 x 15-minute segment	*#
Broadcast: Late Fall, Winter	

* Broadcast time of course varies with region.
\# Government Project related course.

F10— STORAGE OF FERTILIZERS

- Proper storage of fertilizer before fertilizing and storage of left-overs.

Time: 1 x 15-minute segment
Broadcast: Early Spring, Early Fall

(G) WEED CONTROL

1. Introduction

The major potential losses in agricultural products are caused by insects, plant diseases, and weeds. For prevention of such losses, Courses G, H, and I present the farmer with protection techniques for the prevention of such losses.

The Weed Control course should emphasize cultivation techniques of weed control and recommend resorting to herbicides only if necessary. The course snould also cover safety in handling of the chemicals. Since weeds are crop specific, the course elements are organized along the major crops.

2. Course Elements: Weed Control

The course elements for Weed Control are as follows:

Course Number	Production Time (minutes)	Topic
G1	30	Chemical Weed Control
G2	30	Weed Control in Grain Crop
G3	15	Weed Control for Sugar Beets
G4	15	Weed Control for Leguminous Fodder
G5	15	Weed Control for Tomatoes
TOTAL PRODUCTION TIME	105 min. = 1.75 hrs.	

G1 — CHEMICAL WEED CONTROL

Classification of Uses

- Selective (emphasize)
- Non-selective (emphasize)
- Soil applied
- Foliage applied
- Not mobile in plant
- Mobile in plant

Timing of Use

- Pre-plant (emphasize)
- Pre-emergence (emphasize)
- Post emergence (emphasize)
- Lay by
- Post harvest

Toxiology and Safety

- Mammalian toxicity (emphasize)
- Residues in crop
- Residues in soil, crop rotation

Effect of Environment

- Soil types
- Effect of weather (rain, irrigation, temperature)

Time: 2 x 15-minute segments
Broadcast: Late Spring

G2 — WEED CONTROL IN GRAIN CROP

Major Weeds: Avena fatua, Convolvulus Sp., Centaurea.

- Identification
- Growth habits (characteristics of the plant).
- Method of spread (seed, vegetative).

Concepts of Weed Control

- Prevention (machinery, clean improved seed, water)
- Cultural control
  - crop varieties
  - timing of sowing
  - fertilization
- Mechanical control
  - blind cultivation
  - cultivation
  - rolling
  - plowing
- Chemical
  - broadleaved crops - 2, 4-D, MCPA
  - Avena fatua - Carbyne, Avadex BW, Avenge

Time: 2 x 15-minute segments	*
Broadcast: Late Summer	

* Broadcast time of course varies with region.

G3 — WEED CONTROL FOR SUGAR BEETS

Major Weeds: Galium Tricorne, Convolvulus Arvensis, Agropyron Repens

- Identification
- Growth habits (characteristics of the plant).
- Method of spread (seed, vegetative).

Concepts of Weed Control

- Prevention (machinery, clean improved seed, water).
- Cultural control
  - crop varieties
  - timing of sowing
  - fertilization
- Mechanical control
  - hoeing
  - plowing
  - cultivation (sweeps, knives, rolling cultivators, plough)
- Chemical

Time:	1 x 15-minute segment *
Broadcast:	Spring

* Broadcast time of course varies with region.

G4 — WEED CONTROL FOR LEGUMINOUS FODDER

Major Weeds: Cichorium-imtylus, Agropyron Repens, Sorghum Hale Pens

- Identification
- Growth habits (characteristics of the plant).
- Method of spread (seed, vegetative).

Concepts of Weed Control

- Prevention (machinery, clean improved seed, water).
- Cultural control
  - crop varieties
  - timing of sowing
  - fertilization
- Mechanical control
  - burning
  - plowing
  - cultivation (harrows, discs)
- Chemical

Time: 1 x 15-minute segment *
Broadcast: Spring

* Broadcast time of course varies with region.

G5 — WEED CONTROL FOR TOMATOES

Major Weeds: Cuscuta, Broom-Rape, Amaranthus Retroflexus

- Identification
- Growth habits (characteristics of the plant).
- Method of spread (seed, vegetative).

Concepts of Weed Control

- Prevention (machinery, clean improved seed, water).
- Cultural control
  - crop varieties
  - timing of sowing
  - fertilization
- Mechanical control
  - hoeing
  - plowing
  - cultivation (sweeps, knives, rolling cultivators, plough)
- Chemical

Time: 1 x 15-minute segment	*
Broadcast: Summer	

* Broadcast time of course varies with region.

(H) PLANT DISEASES

1. Introduction

Since plant diseases can, in general, be prevented, the course element should emphasize preventative measures. The material should teach the farmer to identify the diseases, describe basic practical actions to be taken before and after planting, and describe control measures including safety considerations for chemicals.

Most courses should be specific to the crops. They can be divided into the three major categories: diseases of field crops, vegetables, and orchards. In each crop type there can occur a wide variety of diseases; furthermore, the best treatment for a disease may vary with local conditions. In preparing the courses, the agricultural experts should evaluate the different diseases for each crop in terms of their importance in causing crop losses. Treatments should similarly be compared in their effectiveness and ability of the farmer to carry them out. The courses should clearly describe the most effective and simple treatments of the most damaging diseases. Less common diseases and treatments should be presented with less emphasis and include referral of the farmer to local advisors.

2. Course Content: Plant Diseases

The content of the course elements, Plant Diseases, are as listed below:

Course Number	Production Time (minutes)	Topic
H1	15	Identification and Control of Diseases
H2	15	Common Diseases and Treatment for Grains
H3	15	Common Diseases and Treatment for Sugar Beets
H4	15	Common Diseases and Treatment for Leguminous Fodder
H5	15	Common Diseases and Treatment for Tomatoes
H6	15	Common Diseases and Treatment for Apples and Pears
TOTAL PRODUCTION TIME	90 min. = 1.5 hrs.	

H1 — IDENTIFICATION AND CONTROL OF DISEASES

- Definition of diseases.
- Cause of plant diseases, such as fungi, bacteria, viruses, nomatodes, dodder, mistletoe, air pollution.
- Identification of diseases
    - what to look for
    - symptoms or identification of major diseases of each crop in each region and their life cycles in relation to environment
- Control
    - cultural programs (planting date, crop rotation, sanitation, irrigation)
    - chemical controls (seed treatment, field spray, soil treatment, post-harvest)
    - resistant varieties
    - use of disease-free planting material (seed, root stocks)

Time: 1 x 15-minute segment
Broadcast: Early Winter

H2 — COMMON DISEASES AND TREATMENT FOR GRAINS

- Major diseases (e.g., stripe rust, leaf rust, covered rust, and powdery mildew).
- Action for prevention (use of resistant varieties, seed treatment with fungicides, crop rotation, control of insect vectors, and proper harvesting and storage).

Time: 1 x 15-minute segment	*
Broadcast: Fall; repeat Winter	

H3 — COMMON DISEASES AND TREATMENT FOR SUGAR BEETS

- Major diseases (e.g., curly top, nematodes, powdery mildew and seedling disease).
- Action for prevention (e.g., resistant varieties, soil fumigation, seed treatment with fungicides, crop rotation, control of insect vectors, and proper harvesting and storage).

Time: 1 x 15-minute Segment	*
Broadcast: Late Spring; repeat Winter	

* Broadcast time of course varies with region.

H4 — COMMON DISEASES AND TREATMENT FOR LEGUMINOUS FODDER

- Major diseases (leaf spots, virus diseases, downy mildew, powdery mildew and root diseases).
- Action for prevention (e.g., resistant varieties, seed treatment with fungicides, crop rotation, control of insect vectors, and proper harvesting and storage).

Time: 1 x 15-minute Segment	*
Broadcast: Late Spring	

H5 — COMMON DISEASES AND TREATMENT FOR TOMATOES

- Major diseases (e.g., root-knot nematode, root-rot, wilting diseases and late blight).
- Action for prevention (e.g., resistant varieties, soil fumigation, crop rotation, spraying and proper picking and storage).

Time: 1 x 15-minute Segment	*
Broadcast: Summer; repeat Winter	

* Broadcast time of course varies with region.

H6 — COMMON DISEASES [illegible]ATMENT FOR APPLES AND PEARS

- Major diseases (e.g., scab, powdery mildew, virus diseases, and post-harvest decay).
- Action for prevention (e.g., planting healthy trees and treatment of soil before planting, spraying and dusting, post harvest).

Time: 1 x 15-minute Segment	*
Broadcast: Spring	

* Broadcast time of course varies with region.

(I) PEST AND INSECT CONTROL

1. Introduction

Course elements in insect and pest control should enable the farmer to identify different insects and distinguish the harmful from the beneficial ones. For each crop, the specific courses should describe the major insects, the seasons when they are present, characteristics of their life cycles, and effective protective measures. The use of chemicals should be with consultation of Agricultural Extension Service of that region and safety factors of chemical use should be stressed.

Similar information should be presented for control of pests such as rats, mice, and birds which most frequently attack stored crops.

Where measures are not straightforward, the courses should refer the farmer to agricultural experts for advice.

2. Content of Course Elements: Pest and Insect Control

The course elements for Pest and Insect Control are as follows:

Course Number	Production Time (minutes)	Topic
I1	30	Beneficial and Harmful Insects
I2	15	Prevention of Major Pests and Insects in Grain Crops
I3	15	Prevention of Major Pests and Insects in Sugar Beets
I4	15	Prevention of Major Pests and Insects in Tomatoes
I5	15	Prevention of Major Pests and Insects in Leguminous Fodder
I6	15	Prevention of Major Pests and Insects in Apples and Pears

Course Number	Production Time (minutes)	Topic
I7	15	Community Programs for Prevention of Pests and Insects
I8	15	Prevention of Locusts and Rats in the Field
TOTAL PRODUCTION TIME	135 min. = 2.25 hrs.	

I1 — BENEFICIAL AND HARMFUL INSECTS

Beneficial Insects used for:

- Silk, beewax, honey, shellac, etc.
- Aid in the production of fruits, seeds, etc.
- Food for animals and birds.
- Insects which destroy other harmful insects and weeds.

Harmful Insects which:

- Damage growing crops and plants.
- Injure man and animals.
- Spread disease.

Time: 2 x 15-minute Segments Broadcast: Late Spring

I2 — PREVENTION OF MAJOR PESTS AND INSECTS IN GRAIN CROPS

Major Pests and Insects: Bug (vrigaster integrieceps), Aphids (different species)

- Why pests and insects occur and what damage they cause.

Mechanical and Physical Protection:

- Drainage, hand destruction, screening nets, traps and crushing, crop rotation, tilling, resistant varieties.

Chemical Protection: (emphasize Extension Officer consultation)

- Identifying the harmful insect and the type of damage and the density of insects per unit required for chemical control.
- Choice of method with respect to cost.
- Choice of proper chemical with advice from Agricultural Extension Service.
- Use of proper equipment.
- Safety precautions.

Proper Storage of Harvested Crop

Time: 1 x 15-minute Segment	*
Broadcast: Summer	

* Broadcast time of course varies with region.

I3 — PREVENTION OF MAJOR PESTS AND INSECTS IN SUGAR BEETS

Major Pests and Insects: Leaf Hopper, Caraderina, Army Worms, two species of weavils, aphids

- Why pests and insects occur and what damage they cause.

Mechanical and Physical Protection:

- Drainage, hand destruction, screening nets, traps and crushing, crop rotation, tilling, resistant varieties.

Chemical Protection: (Emphasize Extension Officer consultation)

- Identifying the harmful insect and the type of damage and the density of insects per unit required for chemical control.
- Choice of method with respect to cost.
- Choice of proper chemical with advice from Agricultural Extension Service.
- Use of proper equipment.
- Safety precautions.

Proper Storage of Harvested Crop

Time: 1 x 15-minute Segment	*
Broadcast: Late Spring	

* Broadcast time of course varies with region.

I4 — PREVENTION OF MAJOR PESTS AND INSECTS IN TOMATOES

Major Pests and Insects: Pieridae, Grillidae, Corn-ear Worm, Pin Worm, Army Worm, Bushy Top

- Why insects and pests occur and what damage they cause.

Mechanical and Physical Protection:

- Drainage, hand destruction, screening nets, traps and crushing, crop rotation, tilling, resistant varieties.

Chemical Protection: (Emphasize Extension Officer consultation)

- Identifying the harmful insect and the type of damage and the density of insects per unit required for chemical control.
- Choice of method with respect to cost.
- Choice of proper chemical with advice from Agricultural Extension Service.
- Use of proper equipment.
- Safety precautions.

Proper Storage of Harvested Crop

Time: 1 x 15-minute Segment	*
Broadcast: Summer	

* Broadcast time of course varies with region.

I5 — PREVENTION OF MAJOR PESTS AND INSECTS IN LEGUMINOUS FODDER

Major Pests and Insects: Scolittdei, Army Worms, Aphids, Weavils

- Why insects and pests occur and what damage they cause.

Mechanical and Physical Protection:

- Drainage, hand destruction, screening nets, traps and crushing, crop rotation, tilling, resistant varieties.

Chemical Protection: (Emphasize Extension Officer consultation)

- Identifying the harmful insect and the type of damage and the density of insects per unit required for chemical control.
- Choice of method with respect to cost.
- Choice of proper chemical with advice from Agricultural Extension Service.
- Use of proper equipment.
- Safety precautions.

Proper Storage of Harvested Crop

Time: 1 x 15-minute Segment	*
Broadcast: Summer	

* Broadcast time of course varies with region.

I6 — PREVENTION OF MAJOR PESTS AND INSECTS IN APPLES AND PEARS

Major Pests and Insects: Coddling Moth, Coccidae, Psyllidae, Hymeno Ptera

- Why insects and pests occur and what damage they cause.

Mechanical and Physical Protection:

- Drainage, hand destruction, screening nets, traps and crushing, crop rotation, tilling, resistant varieties.

Chemical Protection: (Emphasize Extension Officer consultation)

- Identifying the harmful insect and the type of damage and the density of insects per unit required for chemical control.
- Choice of method with respect to cost.
- Choice of proper chemical with advice from Agricultural Extension Service
- Use of proper equipment.
- Safety Precautions.

Proper Storage of Harvested Crop

Time: 1 x 15-minute Segment	*
Broadcast: Spring	

* Broadcast time of course varies with region.

I7 — COMMUNITY PROGRAMS FOR PREVENTION OF INSECTS AND PESTS

- Which insects or pests need community action.
- How insect or pest prevention in the community should be planned.
- Where to obtain advice.
- How responsibilities should be assigned to individuals in the community.
- What chemical and non-chemical practices should be used.

Time:	1 x 15-minute Segment *
Broadcast:	Spring

*Broadcast time of course varies with region.

I8 — PREVENTION OF RATS IN THE FIELD

- Why there is a rat problem.
- Ways to prevent rats on the farm.
- Emergency action steps to take when they appear.
- Mechanical and physical protection.
- Information about other pests and regions where they occur.

Time:	1 x 15-minute Segment
Broadcast:	Spring; repeat Winter

(J) ADDITIONAL INFORMATION FOR SPECIFIC CROPS

1. Introduction

Most actions relating to the different crops are covered in courses C through I, either in general terms or in specific terms where the variation with crops warrants. In addition to these courses, there should be specific courses for the most important crops covering mainly their planting and harvesting. These should be broadcast in the time shortly preceding the activity. Grain, leguminous fodder, sugar beets are covered below; other crops could be added as needed.

2. Content of Courses: Additional Information for Specific Crops

The course elements are listed below:

Course Number	Production Time (minutes)	Topic
J1	15	Planting Irrigated and Rainfed Grain
J2	15	Harvesting Irrigated and Rainfed Grain
J3	15	Planting of Sugar Beets
J4	15	Harvesting of Sugar Beets
J5	15	Forage Planting on Irrigated Land
J6	15	Planting of Leguminous Fodder
J7	15	Growing and Harvesting of Leguminous Fodder
J8	15	Vegetable Planting (Tomato)
J9	15	Selection of Tomato Variety
J10	15	Marketing and Storing of Tomatoes
J11-J15	90	Deciduous Fruit (Apples, Pears)
J16	15	Range Management
J17	15	Range Reseeding on Rainfed Land
TOTAL PRODUCTION TIME	270 min	4.5 hrs.

J1 — PLANTING IRRIGATED AND RAINFED GRAIN

- Preseeding weed control.
- Soil and seedbed preparation and seed varieties.
- Tillage
- Time of planting.
- Planting depth.
- Moisture conservation.
- Summer fallowing*
- Crop rotation*
- Advantages of legumes rotation*

* Mostly for rainfed grain.

Time: 1 x 15-minute Segment	*#
Broadcast: Late Summer	

J2 — HARVESTING IRRIGATED AND RAINFED GRAIN

- Harvesting and stubble utilization.
- Double cropping in areas with long Fall.
- Threshing, cleaning, storing.

Time: 1 x 15-minute Segment	*
Broadcast: Early Summer	

* Broadcast time of courses varies with region.
# Government Project related course.

J 3 — PLANTING OF SUGAR BEETS

- Seedbed preparation and selection of seed variety.
- Method of planting.
- Thinning.

Time: 1 x 15-minute Segment	*#
Broadcast: Early Spring	

J 4 — HARVESTING OF SUGAR BEETS

- Time of harvesting.
- Amount of nitrogen in soil for harvesting

Time: 1 x 5-minute Segment	*
Broadcast: Fall	

* Broadcast time of courses varies with region.
# Government Project related course.

J5 — FORAGE PLANTING ON IRRIGATED LAND

- Why forage production (soil fertility and plant nutrients).
- What kinds of forage to plant.
- When to plant, how much to plant (livestock feeding, winter and supplementary feeding).
- Increase production per hectare.
- Increase in the value of forage.

Time: 1 x 15-minute Segment	*#
Broadcast: Late Winter, Late Summer	

* Broadcast time of course varies with region.
\# Government Project related course.

J6 — PLANTING OF LEGUMINOUS FODDER

- Preseeding weed control.
- Seedbed preparation.
- Variety selection.
- Planting depth.
- Planting time.
- Method of planting.
- Rate of seeding.

Time: 1 x 15-minute Segment	*#
Broadcast: Early Spring	

J7 — GROWING AND HARVESTING OF LEGUMINOUS FODDER

- Emphasizing weed control, irrigation and fertilization.
- Proper harvest frequency.
- Harvesting and stubble utilization.

Time: 1 x 15-minute Segment	*
Broadcast: Early Spring, Summer	

* Broadcast time of courses varies with region.
\# Government Project related course.

J8 — VEGETABLE PLANTING (Tomato)

- Soil, seedbed preparation and seedbed planting.
- Early and late season planting, seed sowing.
- Seeding and thinning.

Time: 1 x 15-minute Segment	*#
Broadcast: Summer	

J9 — SELECTION OF TOMATO VARIETY

- Time of Planting.
- Time of Harvest.
- Planting distance.
- Factors of yield and quality.

Time: 1 x 15-minute Segment	*#
Broadcast: Summer	

* Broadcast time of courses varies with region.
\# Government Project related courses.

J10 — MARKETING AND STORING OF TOMATOES

- When and how to harvest.
- When and how to market.
- How to get information about marketing.
- How to store.

Time: 1 x 15-minute Segment
Broadcast: Spring

* Broadcast time of course varies with region.

J11 — SPACING OF DECIDUOUS TREES (Apple, Pear)

Time: 1 x 15-minute Segment *
Broadcast: Late Fall

J12 — CARE OF YOUNG DECIDUOUS TREES (Apple, Pear)

Time: 1 x 15-minute Segment *
Broadcast: Late Fall

J13 — METHOD OF BUDDING AND GRAFTING DECIDUOUS TREES (Apple, Pear)

Time: 2 x 15-minute Segments *
Broadcast: Summer

J14 — SELECTION OF VARIETY AND ROOTSTOCK FOR DECIDUOUS TREES (Apple, Pear)

Time: 1 x 15-minute Segment *
Broadcast: Fall

J15 — PRINCIPLES OF PRUNING AND TREE TRAINING FOR DECIDUOUS TREES (Apple, Pear)

Time: 1 x 15-minute Segment *
Broadcast: Late Fall, Winter

* Broadcast time of courses varies with region.

J16 — RANGE MANAGEMENT

- General introduction to range management.
- Grazing management, stocking rates.
- Use of different techniques for different types of range.
- Cutting leftover grass; pasture boundaries.
- Animals in pasture land.

Time: 1 x 15-minute Segment
Broadcast: Late Spring

J17 — RANGE RESEEDING ON RAINFED LAND

- Why range reseeding is needed.
- What are the advantages of reseeding.
- Where and what type of land should be taken into consideration.
- Methods of reseeding and regeneration; varieties and strains of suitable grasses.

Time: 1 x 15-minute Segment	#
Broadcast: Early Fall	

Government Project related course.

C. INFORMATION PROGRAMMING

The previous section gave a complete list of courses intended to provide instructional information to the traditional farmers. In addition to these materials there can be regular informational broadcasts that have more of a news format. These programs would contain local information not included in the instructional programs, weather, etc. The form of transmission might be either radio or television or possibly both. Scheduling of the programs would have to consider the same farmer time availability as is discussed in the next chapter. The topics that would be scheduled through such regular broadcasts could include the following.

Spot Announcements

- Daily weather forecast
- Appropriate time for farm activities, e.g., planting
- Market information
- Occurrence of outbreaks of pests or animal or plant diseases with appropriate recommendations for action
- Announcements of the schedules of the instructional program topic areas
- Guidance on availability of various resources or progress of government programs related to courses discussed in Chapter IV, Section G

Motivational and Discussion Programs

- Description of purpose and progress of government programs
- Visits to local farms employing the techniques being recommended by the instructional programs
- Description of where local extension services are to be found and what their functions are. Interviews with extension workers
- Discussions by farmers of actions they, or the government, are taking

News

- Other current information of more general interest to the farmer

Programming of this type is already available in some areas. It is important that these informational programs be properly related to and support the instructional programs.

D. PRODUCTION GUIDELINES

In translating the content description into courses, a number of guidelines should be borne in mind. The following recommendations have come from many of the content experts consulted.

1. Content

The content of the course elements described above has been developed through extensive consultation with agricultural experts. Messages not able to be persuasively given through television and duplication have been eliminated. The remaining advice is intended to be given in short, clear presentations. It is important to maintain this simplicity of message in developing each 15-minute segment.

Script development of the message described above should be done with input from a subject area expert and reviewed by an experienced extension service worker. The Iranian experts provided to this study by the Ministry of Agriculture and acknowledged in the references might serve as a starting point for developing such input.

2. Selection of Announcer

It is important that the announcer in the programs be able to establish a relationship of trust and friendship with the audience. A good teacher with experience as an extension officer could be an effective rural broadcaster. If he knows the rural milieu, the audience, and can

identify himself with it, his explanations can be more acceptable.

The on-camera behavior of the announcer must readily accord with the sensibilities of the farmers. His dress should be a type common to rural areas rather than towns. He should never talk down to, or patronize, the farmer, but rather use the simple language of the people. Even his gestures or the way he sits should be consistent with typical rural practices.

The announcers should be carefully selected and their effectiveness in gaining the trust of the audience should be evaluated early.

3. Presentation Format

It is felt by the experts consulted that the presentations that will be most effective should involve the farmer and the traditional farm environment in the program (i.e., remote filming). A predominantly studio format is not expected to be as effective.

The materials should not be presented as a recipe for the farmers. Rather, it should introduce the technique step by step, showing the farmer the alternatives available to him and their advantages. The traditional technique should be shown, then the improved technique and the improvements as they are seen from the farmer's viewpoint.

Interviews with farmers who have initiated the practice and discussions of the advantages with other farmers are expected to be effective in persuading the farmers to consider the improved methods. (The acceptability of an instructional program may be improved by informational programs,as in Section C, conducting interviews with local farmers who have adopted the practice.)

In selection of farms for the remote filming, care should be taken to ensure that the environment in the picture is typical of the traditional farm environment so that the farmer feels at home. This should be done for illustrations of both old and new techniques.

For many subject areas, the season of the year will be critical to obtain illustrations of the practice being considered. The production planning should reflect this in setting up the order of course production within a year.

Trick, or artistic, effects in filming should be avoided. The presentation visually should be kept as simple as possible, whether in the field or in the studio.

4. Selection of Props

It is important to select props needed in the programs that are familiar and accessible to the farmers. Where a new technique is being introduced that requires aquisition of some machine, or products such as fertilizer or seed, it is important to use common brands that the farmer can acquire locally. If there is a variation of availability in the country and the item is crucial to the technique being introduced, the message should say where information can be found on acquiring the item.

5. Evaluation

The effectiveness of the programming is crucial to the success of the agricultural programs. Farmer acceptability will depend on how simply the message is presented, how comfortable the farmer is with the way the advantages are illustrated, and the effectiveness of the announcer.

In the early phases of the project, a simple course sequence covering an important subject ought to be field tested cooperatively with the agricultural experts to evaluate the effectiveness of the production techniques being used, the role of the lead farmer in the villages, discussion meetings, and the interaction with the extension services.

Results of evaluation should be used to revise the given course element and provide guidelines for additional course production.

There should also be continued evaluation of the programming as the full complement of courses are produced.

CHAPTER IV

BROADCAST SCHEDULING

A. INTRODUCTION

The previous chapter resulted in the definition of over 40 hours of program production to cover the instructional material for Iran's farmers. The material is made of short (15 to 30 minute) course segments, each addressing a specific issue of importance to farmers. Some segments are important to all farmers throughout Iran. Some are significant only to farmers in a few regions. Some can be broadcast anytime during the year. Others must be broadcast at the time of a specific activity to be most effective. Because Iran has several agro-climatic zones, the time of best broadcast may be different for different regions.

For the above reasons, it is necessary to develop separate broadcast schedules for different areas. Each schedule would include just the programs important to that region and would broadcast the programs at the most effective times.

A number of factors must be considered in the scheduling process. These are presented in the following sections of this chapter.

First, the factors affecting the appropriate broadcast time are discussed. These considerations emphasize the time that the farmer can be expected to be free to view a presentation.

Secondly, information is presented on the scheduling flexibility of the network. If necessary, "local" schedules could be developed for 52 separate stations in Iran.

Next, the scheduling requirements for the courses are presented. Some are insensitive to broadcast time; others require particular times

and often repeated showings for most effectiveness.

To simplify the national scheduling process, it is necessary to combine regions into common scheduling areas. The process for doing this is introduced. The procedure is then done for the courses containing the major crops considered as Phase I crops in Chapter III. Ten primary common scheduling areas are thus defined.

With the time availability, course requirements, and schedule areas defined, the next part of the process consists of fitting the available programs into the time slots for each schedule. This is done for the three most crowded schedules for the Phase I programs. The results indicate that the schedules are still relatively uncrowded, allowing flexibility for additional repeated showings, and addition of more locally important crops in successive phases.

The next section discusses program production schedules and development of related government services that may control the growth of the full Phase I schedules presented previously.

The final section presents information important to expansion of schedules in future phases. The crop priorities for each of the 52 broadcast areas is given. Also a more detailed map is given for common agro-economic zones.

This chapter thus presents specific broadcast schedules that can be used in the first phase of a national farmer education program. The schedules are not unique in that there is a lot of flexibility within a schedule for changes. In the final process it is recommended that these or similar schedules be worked out in conjunction with local agricultural experts to achieve the most effectiveness with the farmers.

B. TIME AVAILABILITY

In developing the broadcast schedules the most important time constraint is the time availability of the farmer. Account must be taken of the seasonal variation of the farmer's activity. Broadcasts must also be timed to match his free time of the day. And broadcasts should not coincide with holidays and religious periods when his attention would be elsewhere.

1. Seasonal Variation

Seasonal variation in farmer activity is illustrated by the graph of Fig. II.1. Here the typical man-days required per month are plotted as a function of the months in the year. The data is for typical small farms growing the mix of major crops selected in Chapter III. The typical labor hour needs are taken from Ref. 1 (Vol. VII, pp. 151-190). Other crops will have similar patterns and there will be some shifting in peak activity months in different regions.

The curves show peaks of activity during sowing and harvesting times high enough to require both the labor of the farmer and his family to meet the needs. Between these high periods less demand is placed on the farmer and he is more free to pursue other activities. Program scheduling during the peak periods should be restricted to information concerned exclusively with the farm activities being performed. More general information should be scheduled for the periods of less farmer activity. A graph of this form should be developed for each major schedule area to give general guidance in schedule formation.

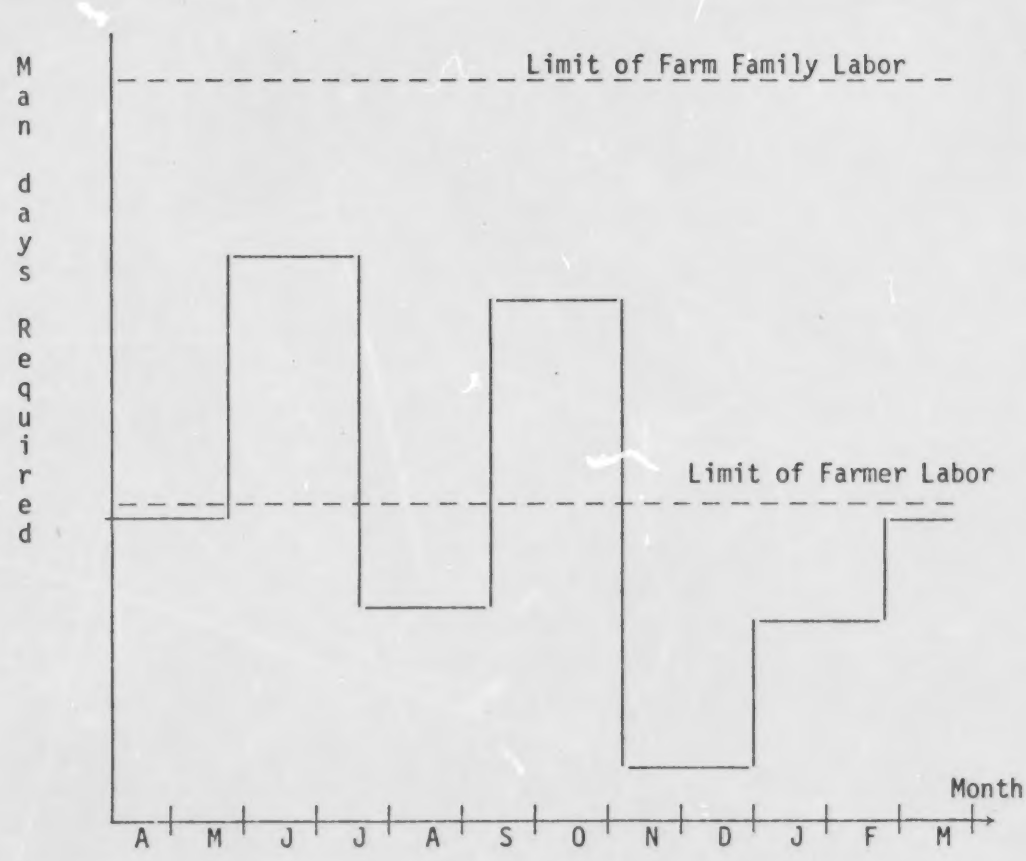


Fig. IV.1. Typical man-days required on small Iranian farms as a function of the month of the year for selected crop.

2. Daily Activity

In scheduling broadcasts during the day it is important to select times carefully. As will be shown in later sections, three half-hour programs per week will be sufficient to present the material, including necessary repetition. The experts consulted agreed that it would be difficult to present information to the farmers with programs longer than thirty minutes (see Chapter III, Section D). Therefore, it will be assumed that for the primary scheduling, three half-hour programs per week will be broadcast. It is necessary to find the best three half-hour time slots to suit the average farmer. It is also necessary to consider alternative broadcast schedules to reach farmers with work habits that differ from the majority.

It is expected that the typical viewing of programs would be done in community centers equipped with community-owned television sets and allowing subsequent discussion of the material by the farmers. Afternoon schedules (up to 4:30 to 6:00 p.m., depending on season) would allow sufficient daylight after the program for the farmers to return to their homes.

Farmers typically rise early and go to the fields to get the work done before the heat of the day. They also normally eat fairly late evening meals. This rules out morning and evening as efficient times for broadcasts.

While some farmers could come to the community center just before the noon meal or sometime after it, in the early afternoon, there are a number of farmers who take their noon meals with them to eat in the fields. From these considerations, the late afternoons would appear to

be a fairly efficient time for the broadcast schedules. This time has been found to be effective for farmer-oriented radio broadcasting in Iran.

In the following scheduling it is assumed that three half-hour programs per week are broadcast in the late afternoons (Saturday, Monday, Wednesday) as the primary instructional program time slots.

To cover farmers for which the above schedules are inconvenient, alternative time slots should be considered. These could be: (1) the alternative days of the working week (Sunday, Tuesday, Thursday) in the late afternoon; (2) late morning or early afternoon either Saturday, Monday, Wednesday or Sunday, Tuesday, Thursday; or, (3) a compressed (1.5 hours) schedules on the weekdend (Friday). Determining the efficiency of the primary schedule and attractiveness of the alternatives described above should be part of the evaluation process in the early stages of the broadcasting. Early afternoon schedules would not be useable in south Iran during summer, due to the heat.

3. Holidays and Religious Periods

There are five major periods when it is assumed that broadcasts would have to be restricted. These are:

- The first three days of the new year (beginning of Spring).
- The 13th day of the new year.

(Both of the above are widely observed national holidays.)

- The death of the prophet Mohammad.
- The month of Ramadan particularly the 19th-21st of that month, the death of the Prophet Ali.
- The first ten days of the month Moharram, particularly the 9th and 10th of that month, the death of the Prophet Hossian.

These are widely observed religious periods. In the following schedules, programs have not been scheduled for any of these time periods. There was little serious compromise in the schedules as a result of this assumption.

However, it should be noted that the religious periods follow the lunar calendar rather than the seasonal calendar. For this reason, these periods will shift their position relative to, say, planting and harvesting times. The month of Ramadan, especially, could cause serious problems when it coincides with critical activities. Under these circumstances, broadcasts during the month (except 19th to 21st) could be considered. Because fasting from meals until sunset will change farmer activity times, the best time of day should be reviewed if broadcasts are needed in Ramadan.

There are other days that may be widely observed in specific regions. These should be included in developing detailed regional schedules.

4. Special Schedule

As is shown in the following schedules, there is a period in the year when the farmer's activity is low and the primary scheduling of programs can be kept fairly low also. It has been suggested that this period could be used to present the material in a more intensive manner with more formally organized discussion groups. If done, this should be related to other community development activities.

With the courses developed in Chapter III, such a schedule could be fit into one to two hours of broadcast two to three days per week,

depending on the crops in the region. At that pace, the total material pertinent to an area would be presented in a two-month period. The benefit of such a concentrated presentation, in addition to the spread-out schedule, should be further investigated.

C. BROADCASTING AREAS

The broadcast schedules, because of variety of crops and seasons, must be different for different areas of Iran. In theory the schedules could be different for each valley. In practice, however, the variety is constrained by the characteristics of the television network. In the early phases the schedules will be constrained by the terrestrial network shown in Figs. IV.2 and IV.3.

The terrestrial network consists of a number of primary broadcast stations that receive signals directly from the distribution system. These primary signals are, in turn, received by automated mountain-top translators that retransmit the signals on a new channel. In Fig. IV.2 an area in central Iran is shown. Here primary transmitters (squares) at Yazd, Rafsanjan, and Kerman feed signals to four, two, and eight translators (triangles), respectively.

If necessary, it is possible to introduce a different broadcast schedule at each primary transmitter to suit local interests. However, the programs on the translators must be the same as on their associated primary transmitter.

Figure IV.3 shows the name and location of all the primary transmitters throughout Iran. There are 52 different primary transmitters in Iran and, therefore, a possibility of matching schedules to 52 different local conditions. As will be seen for the first phase, this high degree of local scheduling is not necessary.

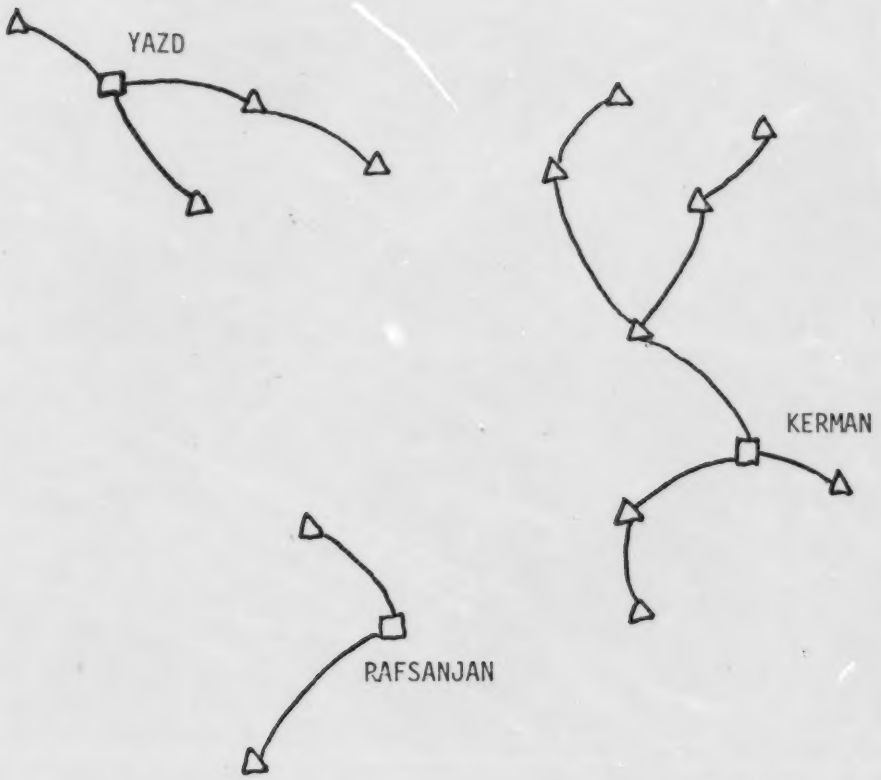


Fig. IV.2. Broadcast Stations and Translators in Central Iran.

Fig. IV.3. Primary Television Broadcast Sites in Iran

D. COURSE SCHEDULING REQUIREMENTS

There are many farm activities that depend on the time of the year. Most agricultural experts agreed that broadcasting related programs just prior to such activities would be most effective. A long gap between the presentation of the information and the action itself would allow the recommendations to be forgotten.

For this reason, the courses should be scheduled prior to the action recommended by the course if at all possible. The courses from Chapter III can be divided into three categories according to their sensitivities to broadcast schedules.

In the first category are courses related to a specific activity done once on a farm during the year (e.g., planting and harvesting an annual crop). The course elements of this kind are given in Table IV.1. These courses would be scheduled at the indicated time for the activity. There may be need for second and third broadcasts of these kinds of courses to cover the situation that even in the same area one farmer may take the action (e.g., planting) anytime over several weeks.

In the second category are courses where the activity on a farm will occur continuously over a definite time interval (e.g., irrigation or insect control). The course elements of this category are contained in Table IV.2. These courses may be schedules several times during the indicated time interval to best bring the message to the farmer.

The remaining category contains courses that are relatively insensitive to the time at which they are broadcast. These courses are fit into the schedule where the farmer's time and the regular broadcast schedules are relatively free.

TABLE IV.1

Courses Related to Most Time Sensitive Farm Activity

PLANTING AND HARVESTING OF CROPS	
Course Number	Topic
J1	Planting Irrigated and Rainfed Grain
J2	Harvesting Irrigated and Rainfed Grain
J3	Planting of Sugar Beets
J4	Harvesting of Sugar Beets
J5	Forage Planting on Irrigated Land
J6	Planting of Leguminous Fodder
J7	Growing and Harvesting of Leguminous Fodder
J8	Vegetable Planting (Tomato)

TABLE IV.2

Courses Related to Time Sensitive Farm Activity

Topic	Course Number	Course Element
Animal Husbandry	B6	Selection of Breeding Animals
	B7	Breeding Types
	B9	Care of Lambs and Calves
	B12	Milk Production & Handling of the Milk
	B19	Types and Breeds of Poultry
	B20	Incubation, Natural and Artificial
	B21	Brooding, Natural and Artificial
Machinery Use	C3	Preliminary Tillage
	C4	Secondary Tillage
	C5	Planting or Crop Establishment
	C6	Cultural Practices
	C7	Harvesting
	C8	Processing, Storage and Handling
Soil Preparation and Crop Choice	D4	Tillage Operation
	D5	Planting in Cold Spring
	D7	Crop Rotation
Irrigation and Fertilizing	E3	Basic Irrigation (grain, leguminous fodder, deciduous fruits)
	E4	Furrow Irrigation (sugar beets, tomatoes, deciduous fruits)
	E5	Sprinkler Irrigation (grain, sugar beets, leguminous fodder, tomatoes, deciduous fruits)
	E6	Drip Irrigation (mainly deciduous fruits)
	F5	Wheat and Barley Fertilizing
	F6	Sugar Beet Fertilizing
	F7	Leguminous Fodder Fertilizing
	F8	Vegetable Fertilizing (Tomato)
	F9	Deciduous Tree Fertilizing
Crop Protection	G2	Weed Control in Grain Crop
	G3	Weed Control for Sugar Beets
	G4	Weed Control for Leguminous Fodder
	G5	Weed Control for Tomatoes
	H2	Common Diseases and Treatment for Grains
	H3	Common Diseases and Treatment for Sugar Beets
	H4	Common Diseases and Treatment for Leguminous Fodder
	H5	Common Diseases and Treatment for Tomatoes
	H6	Common Diseases and Treatment for Apples and Pears
	I2	Prevention of Major Pests and Insects in Grain Crops

TABLE IV.2 (cont'd)

Topic	Course Number	Course Element
Crop Protection	I3	Prevention of Major Pests and Insects in Sugar Beets
	I4	Prevention of Major Pests and Insects in Tomatoes
	I5	Prevention of Major Pests and Insects in Leguminous Fodder
	I6	Prevention of Major Pests and Insects in Apples and Pears
	J9	Selection of Tomato Variety
	J10	Marketing and Storing of Tomatoes
	J11	Spacing of Deciduous Trees (Apple, Pear)
	J12	Care of Young Deciduous Trees (Apple, Pear)
	J13	Method of Budding and Grafting Deciduous Trees (Apple, Pear)
	J14	Selection of Variety and Rootstock for Deciduous Trees (Apple, Pear)
	J15	Principles of Pruning and Tree Training for Deciduous Trees (Apple, Pear)

E. PHASE I COMMON SCHEDULING AREAS

In developing the national schedules for agricultural broadcasts, the task will be simplified if areas with common schedules can be found. Then single broadcast schedules can be developed for the related areas and the need for special local programming reduced.

To identify the commonality of the schedules, the growing seasons for the major crops considered in Chapter III have been analyzed. Figures IV.4 through IV.9 present the information. The growing seasons for each crop are shown for each province. Provinces where the crop is not grown are listed under "Nil" categories. Provinces where the crop is grown but the National Cropping Plan recommends against it are listed under "Black" categories.

For each crop provinces in which a common broadcast schedules is feasible are all shown together under a listing for that schedule. Thus, in Fig. IV.4 broadcast schedule, G1, for grain-related courses, is suitable for Khuzestan, Fars, Boyer Ahmad, Bushehr, Saheli, Kerman and Sistan and Baluchestan provinces. The symbols "H" and "P" after the G1 heading indicate where course elements related to harvesting and planting would be repeated to cover the range of planting and harvesting times in those provinces. As is shown in the figure, two additional schedules, G2 with four provinces, and G3 with 12 provinces, are needed to satisfy the growing seasons for grains in the remaining provinces.

Thus, if only grains were grown in Iran, three different schedules would do. However, the schedules for other crops also vary and they vary differently from the schedules for grains. These schedules are shown in Figs. IV.6 through IV.9. Four different schedules are adequate for sugar beets, five schedules for leguminous fodders, and three for deciduous

Figure IV.4

Proper Time Interval of Planting and Harvesting of Grain in Each Province

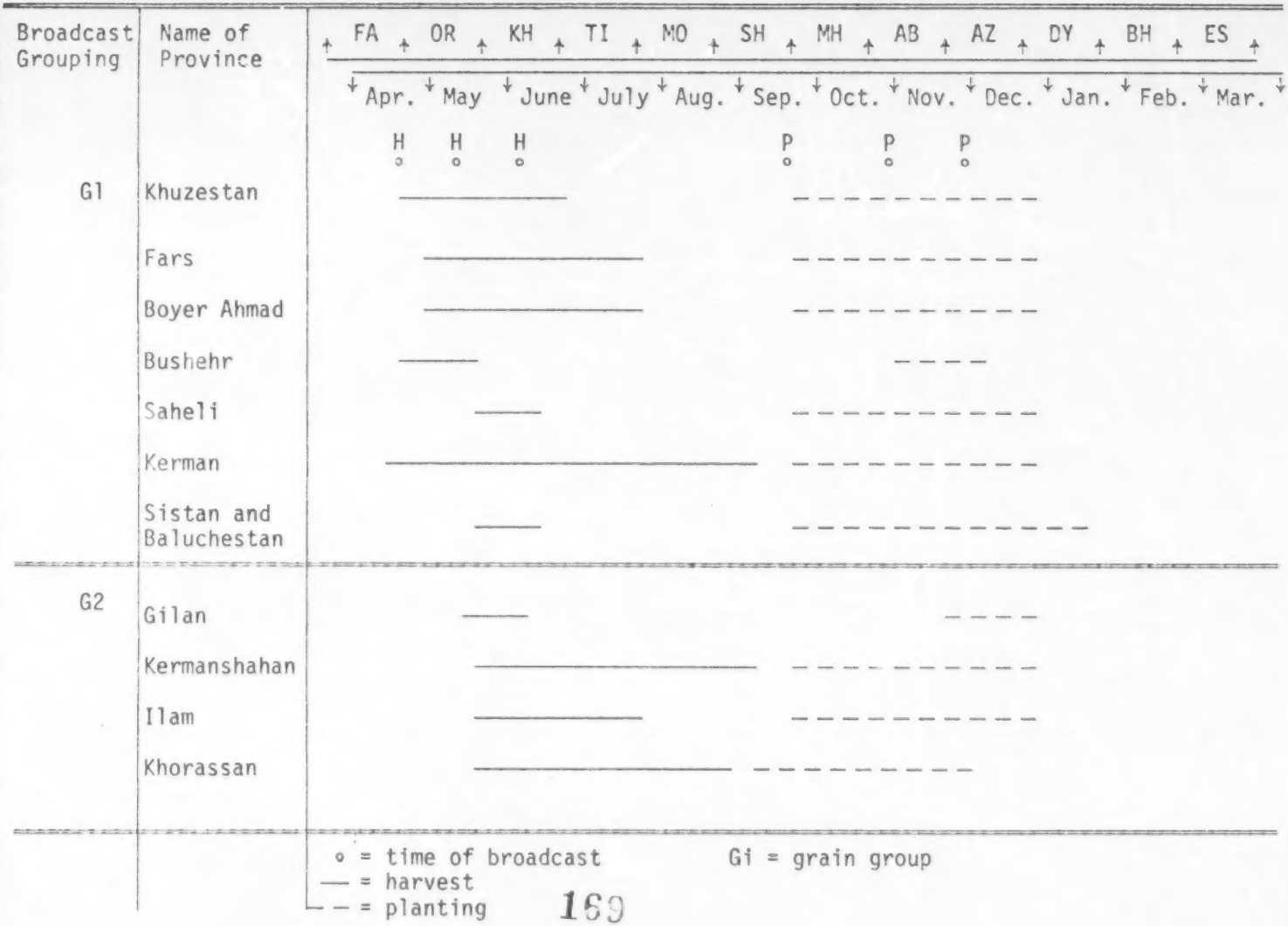


Figure IV.5

Proper Time Interval of Planting and Harvesting of Grain in Each Province (mainly Wheat & Barley)

Broadcast Grouping	Name of Province	FA OR KH TI MO SH MH AB AZ DY BH ES Apr. May June July Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar.
G3	Markazi	H H H P P P ——— - - - - - - - -
	Semnan	——— - - - - - -
	Mazandaran	——— - - - - - -
	E. Azarbijan	——— - - - - -
	W. Azarbijan	——— - - - - - - -
	Kordestan	——— - - - - - -
	Zanjan	—— - - - -
	Hamadan	——— - - - - - - - -
	Lorestan	——— - - - -
	Esfahan	——— - - - - - - - - -
	Yazd	——— - - - - - - - - -
	Charmahal	—— - - - -

Figure IV.6

Proper Time Interval of Planting and Harvesting Sugar Beets in Each Province

Broadcast Grouping	Name of Province	FA	OR	KH	TI	MO	SH	MH	AB	AZ	DY	BH	ES
		Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
S1		P P P					H H H						
	Markazi	- - - - - - - -					———						
	Semnan	- - - - - - - -					———						
	E. Azarbijan	- - - - - - -					———						
	W. Azarbijan	- - - - - - -					———						
	Khorassan	- - - -					———						
S2		H H H				P P P							
	Khuzestan	———				- - - - - - -							
S3							H H H				P P P		
	Esfahan						———				- - - - -		
S4		P							H H H			P	P
	Kerman	- - -							———			- - -	

Figure IV.7

Proper Time Interval of Planting and Harvesting Leguminous Fodder in Each Province

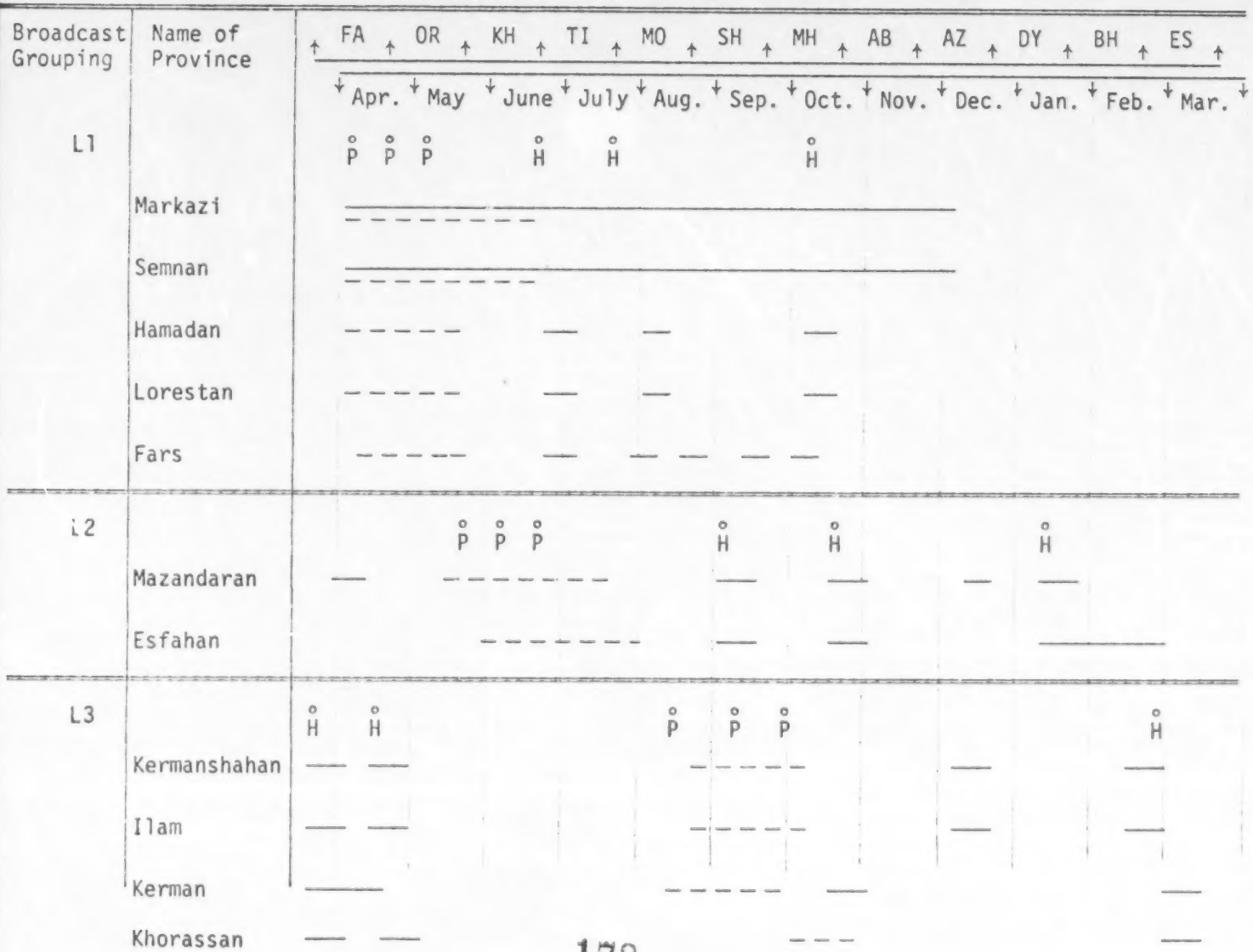


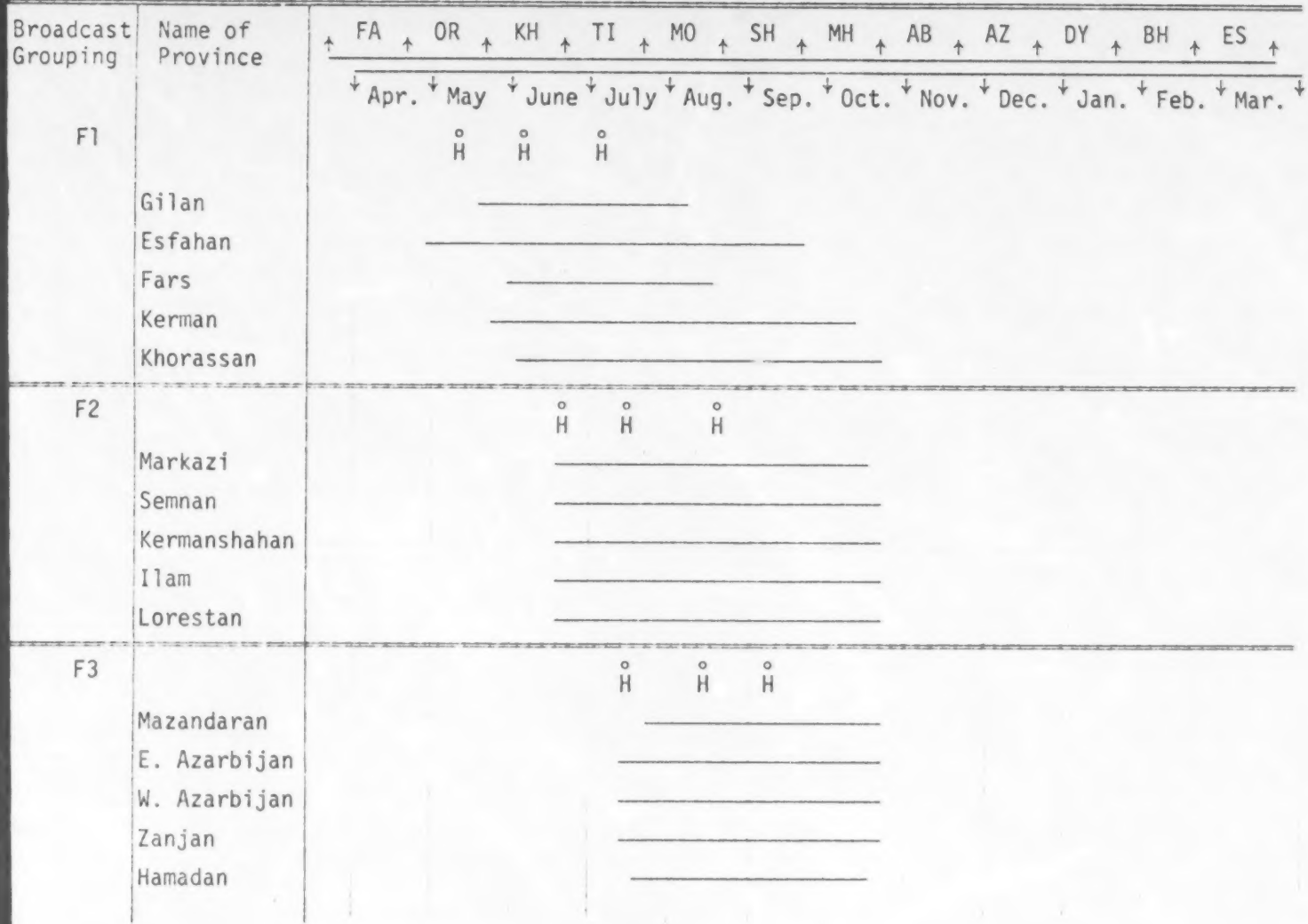
Figure IV.8

Proper Time Interval of Planting and Harvesting Leguminous Fodder in Each Province

Broadcast Grouping	Name of Province	FA OR KH TI MO SH MH AB AZ DY BH ES	Apr. May June July Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar.
L4			H P P P H H
	E. Azarbijan		— — — — — — — — — — — —
	W. Azarbijan		— — — — — — — — — — — —
	Zanjan		— — — — — — — — — — — —
	Kordestan		— — — — — — — — — — — —
L5			H H P P P H
	Khuzestan		— — — — — — — — — — — —

Figure IV.9

Proper Time Interval For Harvesting of Deciduous Fruit in Each Province



fruits. The schedules for tomatoes are not as critical as for the other crops.

Where different provinces have the same schedules for all the crops considered, they can have the same broadcast schedule. If two provinces have the same schedules for all crops except that one or more crops are missing from one province, then the two provinces can still use a common schedule if provision is made to black out the irrelevant programs.

This is reflected in the groupings shown in Table IV.3. Here Markazi and Semnan provinces have the same schedules for all crops. Lorestan also has the same schedules, except that sugar beets are not recommended for that province. Thus, one schedule is satisfactory for those three provinces if appropriate substitutions are made for the course elements related to sugar beets in Lorestan.

Table IV.3 shows the remaining groupings. For the major crops considered in Phase I, there are ten different common broadcast areas. The location of these areas are shown on the map, Fig. IV.10.

Figures IV.11 through IV.18 show the occurrence of the major crops in Iran. These maps and the crop activity schedules were developed from information in Ref. 1, Vol. 5.

The crop occurrence maps and the schedules reflect three different area conditions for crops. In the first kind of area the land is suitable for growing the crop and the crop is recommended by the National Cropping Plan. In the second, the land is unsuitable for the crop. In the third, the land is suitable but the crop is not recommended for that area by the National Cropping Plan. The third category occurs where national production goals would be better met by replacing the crop by another that is more efficient. Some farmers in these areas do grow the crop in question

TABLE IV.3

Common Schedule Areas for Major Crops

I	Markazi	(L1, F2, S1, G3)
I	Semnan	(L1, F2, S1, G3)
I'	Lorestan	(L1, F2, Black, G3)
II	E. Azarbijan	(L4, F3, S1*, G3*)
	W. Azarbijan	(L4, F3, S1*, G3*)
II'	Kordestan	(L4, Nil, Black, G3)
	Zanjan	(L4, F3, Black, G3)
III	Esfahan	(L2, F1, S3*, G3*)
III'	Yazd	(Nil, Nil, Nil, G3)
III'	Charmahal	(Nil, Nil, Nil, G3)
IV	Kerman	(L3, F1, S4, G1*)
IV'	Sistan & Baluchestan	(Nil, Nil, Black, G1)
	Saheli	(Nil, Nil, Black, G1)
V	Khuzestan	(L5*, Nil, S2, G1*)
V'	Bushehr	(L5, Nil, Black, G1)
V'	Boyer Ahmad	(Nil, Nil, Nil, G1)
VI	Kermanshahan	(L3, F2, Black, G2)
	Ilam	(L3, F2, Black, G2)
VII	Fars	(L1*, F1, Black, G1*)
VIII	Mazandaran	(L2, F3, Black, G3*)
IX	Hamadan	(L1, F3, Black, G2)
X	Khorassan	(L3, F1, S1*, G2)
X'	Gilan	(Black, F1, Nil, G2*)

Fig. IV.10. Areas with Common Broadcast Schedules for Selected Crops

- area suitable for the crop

- areas less suited, but recommended for crop by National Cropping Plan

- areas suitable for crop but crop not recommended by National Cropping Plan

Fig. IV.11. Land Suitability for Rainfed Barley

- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

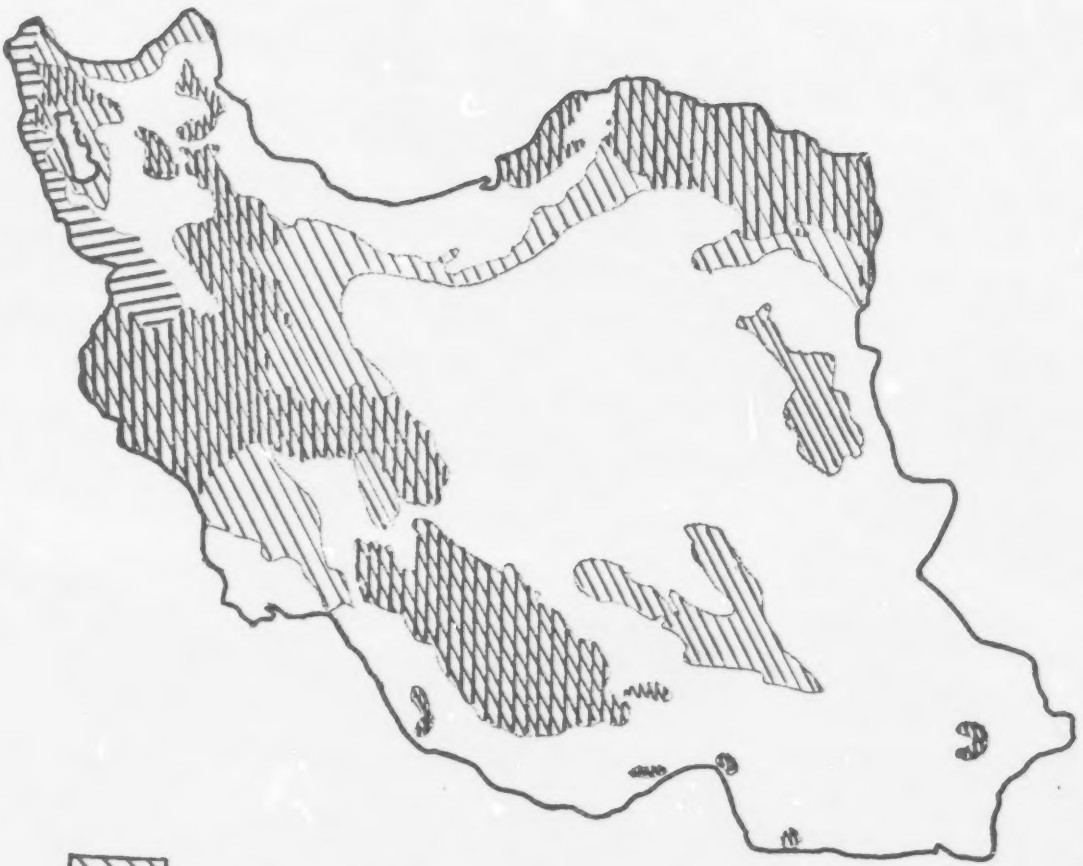
Fig. IV.12. Land Suitability for Irrigated Wheat

- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

Fig. IV.13. Land Suitability for Rainfed Wheat



- area suitable for the crop

- areas less suited, but recommended for crop by National Cropping Plan

- areas suitable for crop but crop not recommended by National Cropping Plan

Fig. IV.14. Land Suitability for Sugar Beets

- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

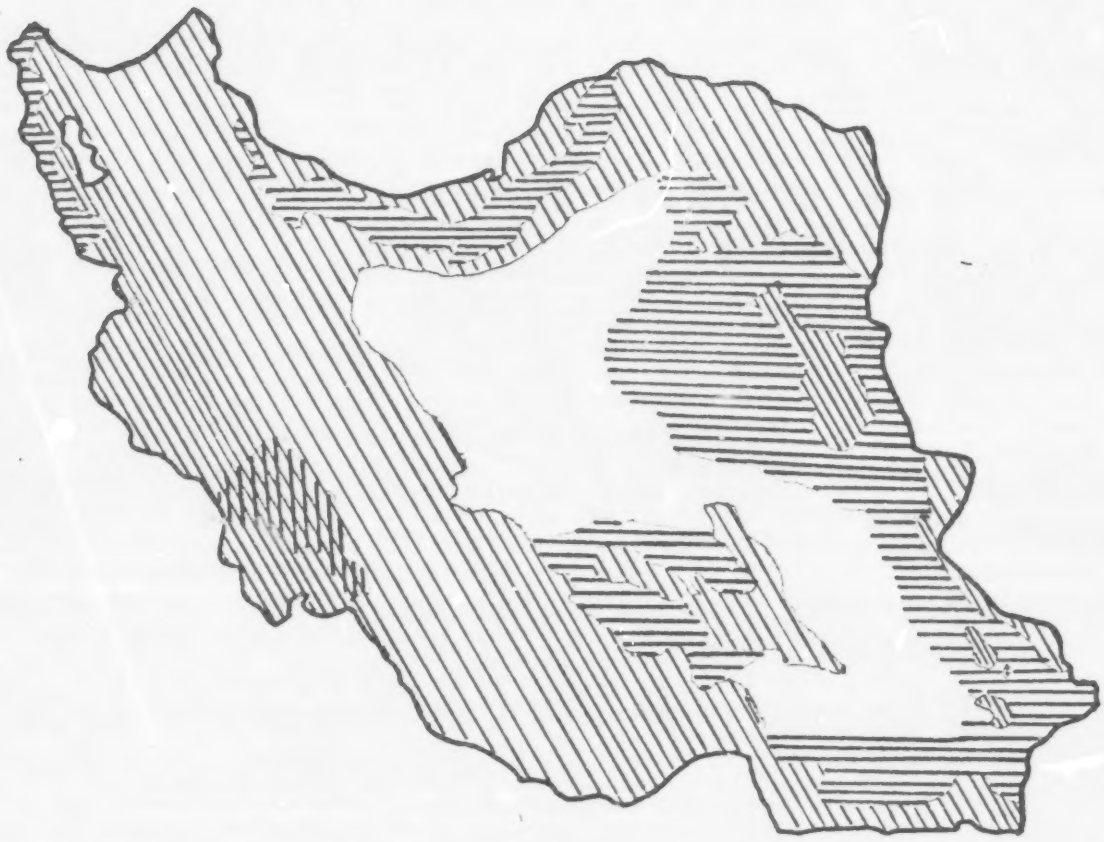
Fig. IV.15. Land Suitability for Leguminous Fodder

- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

Fig. IV.16. Land Suitability for Tomatoes, Small Scale, as a Crop Garden



- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

Fig. IV.17. Land Suitability for Irrigated Barley

- *area suitable for the crop*

- *areas less suited, but recommended for crop by National Cropping Plan*

- *areas suitable for crop but crop not recommended by National Cropping Plan*

Fig. IV.18. Land Suitability for Deciduous Fruit

Key for Table IV.3 :

Symbols: (*)	- The province has some regions in which the crop is not recommended for planting by the National Cropping Plan.
(Nil)	- The province is not suited for this crop; programs of local interest could be broadcast instead.
(Black)	- The crop is not recommended for this province by the National Cropping Plan.
(', e.g. I')	- Same schedule as immediately above, except for "Nil" or "Black" crops.
(L1, F2, etc.)	- Crop schedules as listed in Figs. IV.4 through IV.9.

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and decisions will have to be made by the agricultural planners to decide whether programs related to improved growing practices for these "not recommended" crops should be broadcast in these areas.

The crops considered in this analysis are the major ones identified in Chapter III. Addition of courses related to other crops may call for further division of the common scheduling areas and more variety in local schedules. Information related to this finer division is presented in Section H of this chapter. However, it is felt that for the major applications, the schedule areas shown in Fig. IV.3 will account for the major variation in crop growing seasons in Iran.

F. PHASE I BROADCAST SCHEDULES

Several broadcast schedules have been developed using the guidelines described above. As will be seen, there is a great deal of flexibility in the actual scheduling; the schedules presented here are only examples of several that would suit the needs. In developing the schedules, a number of guidelines have been followed. They are listed below:

- Three half-hour broadcasts are assumed each week. Major national holidays and religious periods are not included. A one-month period in the winter is kept clear for the possible scheduling of special, more intense, broadcasts.

- Course segments are scheduled just prior to the activity they are related to. When the activity occurs over a protracted period (either because farmers start at different times or because it is a continuous process), repeated broadcasts are scheduled about every two weeks.

- Courses not critically related to a particular time are used to fill in the schedule in more slack periods.

- One course element may have more than one fifteen-minute segment. When this occurs, the segments are scheduled on successive days rather than putting two elements on the same day. Thus, each day's half-hour broadcast would cover two different subjects, probably of interest to a higher percentage of farmers. (The advantages and disadvantages of such scheduling should be evaluated.)

- Repeat schedules either on alternate days or on Friday are not shown. Such schedules could be added to increase the probability of farmers viewing the program.

Following these guidelines, schedules have been developed for areas I, II, and III shown on the map, Fig. IV.10. The schedules are presented in the following pages. The course elements are listed in each day of the week for the twelve months of the year. The symbols used are:

Xx zr	Xx: refers to the course elements as listed under each major course description of Chapter III. Thus, A1 refers to the first element of Farm Management, "Principles of Farm Management."

Fig. IV.19 Broadcast Schedules for Regions I, II, and III.

Broadcast Schedule for Region I (Spring)

FARVARDIN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
		J3			G1				G1					J3		C5			F6		B21							C10		G3
		r1			1				2					r2														2		
							E10		A1					J6					E2		F10						C10		B17		J10
							r1		1					r1							Y1						1				r1

ORDIBAHASHT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
		J3		B10		B10			B10		B12		B12			J6		B2		B2			B2		C11		B2			B2
		r3		1		2			3		1		2			r3		2		3			4		2		5			6
		J6		B9		B2			B7		B9		G4			B9		E9					C11				J10			F7
		r2		1		1			2		3					4		1r1					1				r2			

KHORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU
			C6			H2		H6		E3					H4					I1		I1		I3					I6	
						r1				r1										1		2								
	H3		E1			E1		B5					E4		E5		E6										I7		I8	
	r1		1			2							r1		r1		r1												r1	

Broadcast Schedule for Region I (Summer)

TIR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
B12			J13		J13		C7			D1		B24		A5			B12		C12		C12			E4		E5		E6		
3			1		2					r1				2			4		1		2			r2		r2		r2		
J7			I5		J16		J2			B23		A5		B13					E1		E1			J2		B22		F1		
r1							r1					1		1					1r1		2r1			r2				r1		

MORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
J17		E7		J9			J2		B6		B6			B6		B6		B12			F8		H5		I4					
									1		2			3		4		6													
B26		J7		B26			J5		J8					G5		B12		F2			B6		G2		G2		RAMADAN			
1		r2		2			r1		r1							5					5		1		2					

SHAHRIVAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH
																									J4		E9		C4	
																									r1		2r1			
									RAMADAN																J1		C3		J8	
																									r1				r2	

Fig. IV.19 (continued)

Broadcast Schedule for Region I (Fall)

MEHR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
	F3		F3		D7			F5		B19		C8			A3		A3		A4			C9		B13		B4			C15
	1r1		2r1		r1										1		2		1					2		2			
	H2		F4		F10			A1		A5		J4			J7		J1		E3			B4		B20		A2			J4
			r1		r2			2		3		r2			r3		r2		r2			1				2			r3

ABAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
	J14		C13			E8																							
						r1																							
	B4		J1			B4																							
	3		r3			4																							

SPECIAL PROGRAM

AZAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
											J11		F9		J12			J15		B4									
													r1							6									
											B13		C14		B1			B4		C1									
											3				1			6												

SPECIAL PROGRAM

MOHARRAM

Fig. IV.19 (continued)

Broadcast Schedule for Region I (Winter)

DAY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
		H1		D2		I8			B3		B3		B7			A1		B16		B4					B13		B14		
				r1		r2			1		2		4			3				8					5		1		
				D3		B7			B7		B7		B1			B4				B13					D2				
						1			2		3		1			7				4					r2				

BAHMAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU
C2		B14		B15			B15				B8			D1		C3					F7		C4					B18		
1		3		1			2				1					r1					r1		r1							
B14		C2		A2					D7		F1			B13		A4		B8			B13		J15							
2		2		2					r2		r2			6		2		2			7		r2							

ESTAND

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
A1		A4			F2		D4		B14			B25		D6		H3			B11		F3		J5			E9		
4		3			r2		1		4							r2			1		1r2		r2			2r2			
E8		F1			B13		F9		D4			E7		E10		D5			E9		F4		F3			B11			
r2		r3			8		r2		2			r2		r2					1r2		r2		2r2			2			

Fig. IV.19 (continued)

193A

193B

Broadcast Schedule for Region II (Spring)

FARVARDIN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
		J3		G1				G1						J3		C5			F6		B21					B17		C10		G3
		r1		1				2						r2														2		
							E10		A1					J7					F2		F10						C10		J3		J10
							r1		1					r3							Y1						1		r3		1

ORDIBAHASHT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
		B10		B10		B10					B12		B12					B2		B2			B2				B2			B2
		1		2		3					1		2					2		3			4				5			6
				B9		B2			B9		B9		B10			B9		E9					C11		C11		J10			
				1		1			2		3		4			4		1r1					1		2		2			

KHORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU
			C6			H2		H6		E3			B23							I1		I1		I3					I6	
						r1				r1			B23							1		2								
	H3		E1			E1		B5					E4		E5		E6										I7		I8	
	r1		1			2							r1		r1		r1												r1	

Fig. IV.19 (continued)

Broadcast Schedule for Region II (Summer)

TIR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
B12			J13		J13		C7			D1		B24		J6			G4		C12		C12			E4		E5		E6		
3			1		2					r1				r1					1		2			r2		r2		r2		
F1			B22		J16		J2			B12		A5		A5			I5		E1		E1			J2		J6		H4		
r1							r1			4		1		2					1r1		2r1			r2		r2				

MORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
J17		E7		J9			B6		B6		B6			J2		B6		B12			F8		H5		I4					
							1		2		3			r3		4		6													
B16		B13		B26			B12		J8		I2			G5		J6		B6			F2		G2		G2					
1		1		2			5		r1							r3		5					1		2		RAMADAN			

SHAHRIVAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH
																									J4		E9		C4	
																									r1		2r1			
																									J1		C3		J8	
						RAMADAN																			r1				r2	

Fig. IV.19 (continued)

Broadcast Schedule for Region II (Fall)

MEHR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
	F3		F3		D7			F5		B19		C8			A3		A3		A4			C9		B13		B4			C15
	1r1		2r1		r1										1		2		1					2		2			
	H2		F4		F10			A1		A5		J4			J5		J1		E3			B4		B20		A2			J4
			r1		r2			2		3		r2			r1		r2		r2			1				2			r3

ABAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
	J14		C13			E8																							
						r1																							
	B4		J1			B4																							
	3		r3			4																							

SPECIAL PROGRAM

AZAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
J7											J11		F9		J12			J15		B4									
r1	SPECIAL PROGRAM												r1							6									
											B13		C14		B1			B4		C1									
											3				1			5												

MOHARRAM

Fig. IV.19 (continued)

Broadcast Schedule for Region II (Winter)

DAY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
		H1		D2		I8			B3		B3		B7			A1		B16		B4					B13				
				r1		r2			1		2		4			3				8					5				
				D3		37			B7		B7		B1			B4				B13					D2		B14		
						1			2		3		1			7				4					r2		1		

BAHMAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU
C2		B14		B15			B15				B8			D1		C3							C4		B18				
1		3		1			2				1					r1							r1						
B14		C2		A2					D7		F1			B13		A4		B8			B13		J15		J7				
2		2		2					r2		r2			6		2		2			7		r2		r2				

ESTAND

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
A1		A4			F2		D4		B14			B25		D6		H3			B11		F3		J5			E9		
4		3			r2		1		4							r2			1		1r2		r2			2r2			
E8		F1			B13		F9		D4			E7		E10		D5			E9		F4		F3			B11			
r2		r3			8		r2		2			r2		r2					1r2		r2		2r2						

Fig. IV.19 (continued)

Broadcast Schedule for Region III (Spring)

FARVARDIN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
W	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
					G1				G1												B21							C10		
					1				2																			2		
							E10		A1										E2		F10					C10		B17		J10
							r1		1												Y1					1				1

ORDIBAHASHT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
				B10		B10			B10		B12		B12					B2		B2			B2		C11		B2			B2
				1		2			3		1		2					2		3			4		2		5			6
				B9		B2			B9		B9		B10			B9							C11				J10			
				1		1			2		3		4			4							1				2			

KHORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU
	B5		C6			J6				E3			B23		H4		B12			I1		I1		I3			J6		I6	
						r1				r1							3			1		2						r2			
			E1			E1		H2	H6				E4		E5		E6			G4				F7			I7		I8	
			1			2		r1					r1		r1		r1													r1	

Fig. IV.19 (continued)

Broadcast Schedule for Region III (Summer)

TIR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
F1			J13		J13		C7			D1		B24		E9					C12		C12			E4		E5		E6		
r1			i		2					r1				1r1										r2		r2		r2		
B12			B22		J16		J2			J6		A5		A5			E9		E1		E1			J2						
4							r1			r3		1		2			2r1		1r1		2r1			r2						

MORDAD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
J17		E7		J9			B6		B6		B6		J2			B6		B12			F8		H5		I4					
							1		2		3		r3			4		6													
B26		B13		D26			B12		J8		I2			G5		E3		F2			C5		G2		G2					
1		1		2			5									r2							1		2		RAMADAN			

SHAHRIVAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH
																									J4		J1		C4	
																									r1		r1			
											RAMADAN														J7		C3		J8	
																									r1					

Fig. IV.19 (continued)

Broadcast Schedule for Region III (Fall)

MEHR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA
	F3		F3		D7			F5		B19		C8			J5		A4		J4			C9		B13		B4			C15
	1r1		2r1		r1										r1		1		r3					2		2			
	H2		F4		J4			A1		A5		F10					J1		J7			B4		B20		A2			B6
			r2		r2			2		3		r2					r2		r2			1				1			5

ABAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
	J14		C13			E8																							
						r1																							
	B3		J1			B4																							
	3		r3			4																							

SPECIAL PROGRAM

AZAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W
											J11		F9		J12			J15		D4									
													r1							6									
											B13		C14		B1			B4		C1									
											3				1			6											

SPECIAL PROGRAM

MOHARRAM

Fig. IV.19 (continued)

Broadcast Schedule for Region III (Winter)

DAY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F
		H1		D2		I8			B3		B3		B7			A1		J7		B4			B16		B13		B14		
				r1		r2			1		2		3			3		r3		8					5		1		
	C3			C4		D3			B7		B7		B1		B7			B4		B13			A3		A3		D2		
	r2			r2					2		2		1		4			7		4			1		2		r2		

BAHMAN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU
C2		H3		I3			B15		B15		B8			D1		B14		J3			B8		B14		B18				
1							1		2		1			r2		2		r2			2		3							
J3		C2		A2			F6		D7		F1			G3		A4		B13			B13		J15		D5				
r1		2		2					r2		r2					2		6			7		r2						

ESTAND

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M	TU	W	TH	F	SA	SU	M
A1		A4			F2		D4		B14			B25		D6		H3			B11		F3		J5			E9		
4		3			r2		1		4							r2			1		1r2		r2			2r2			
E8		F1			D13		F9		D4			E7		E10		J3			E9		F4		F3			B11			
r2		r3			8		r2		2			r2		r2		r3			r2		r2		2r2			2			

Fig. IV.19 (continued)

z: refers to the z^{th} 15-minute segment of that course element. Thus,

A1
4

would refer to the fourth 15-minute segment of "Principles of Farm Management."

r: refers to repeated broadcasts of the segment during the year.

Figure IV.20 summarizes the crowdedness of the schedules for the three regions. The number of hours for each two-week period is plotted for the whole year. As can be seen, there is some slack in the schedules, even with the repetitions and with avoiding programs in Ramadan and in the intense schedule period.

G. CONSIDERATION OF GOVERNMENT PROJECTS, INPUT AVAILABILITY AND PRODUCTION SCHEDULES

The schedules presented in the above section presumed that courses for all crops and activities suited to the region would be broadcast. These schedules are suited to the years when all the indicated courses have been produced and when any related government programs or other inputs are available. In the early stages of a farmer media education program, only part of the schedule would be filled because of program or input limitations. The full schedule would evolve over successive years as these limits are reduced.

The issues related to program production priority are discussed in Chapter III, Section G. As programs are developed according to such priorities, they would be available to add the regional schedules.

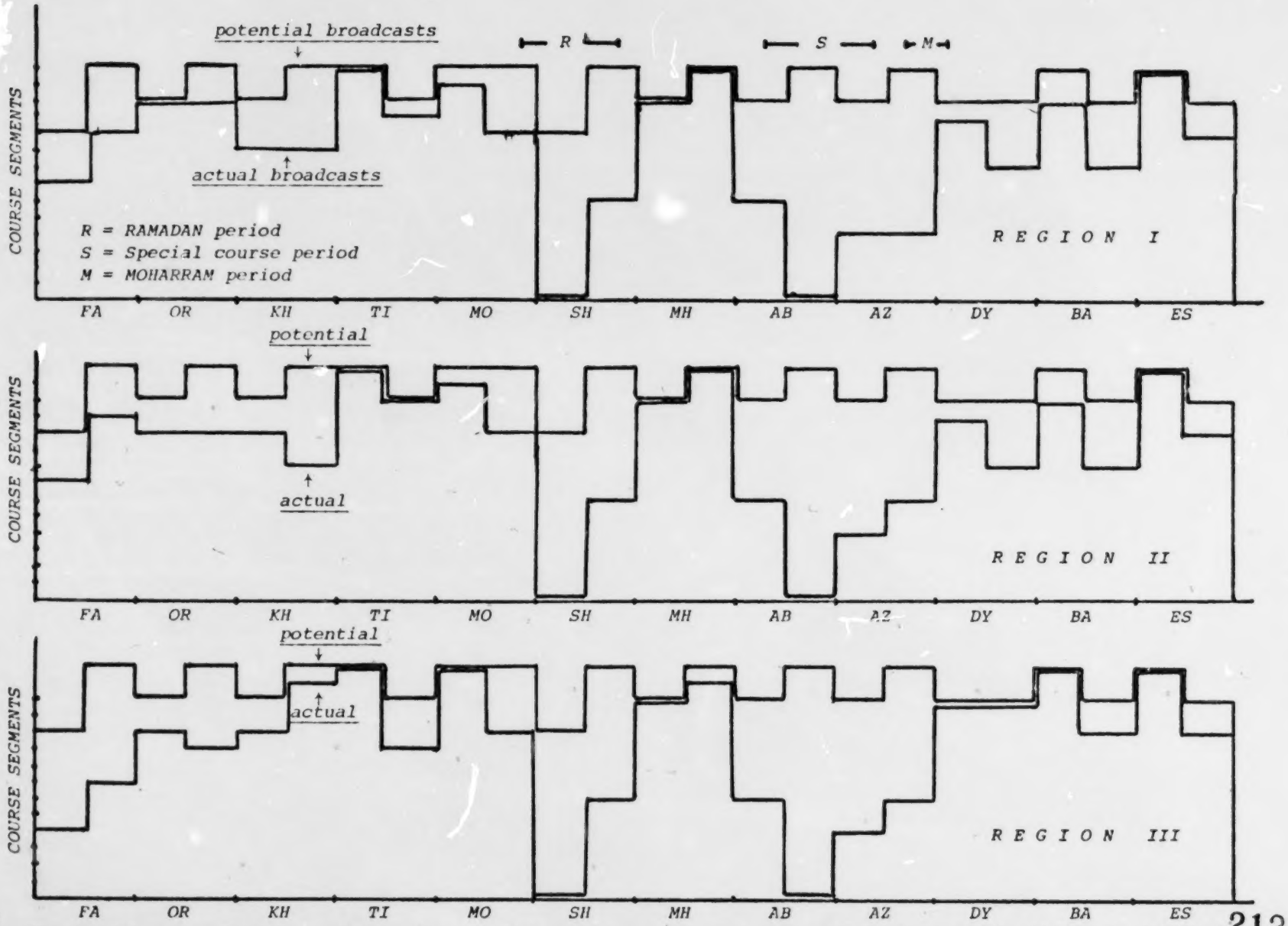

Fig. IV.20 Actual Broadcast Segments for Selected Crops vs. Total Broadcast Segments Available During Year

When the course elements are available from production, the other factors may still delay their introduction to the schedules in particular regions. To be effective. the courses should introduce practices that the farmer could in fact adopt. If the necessary resources are not available, the advice cannot be followed. To avoid the farmer's losing confidence in the programming, such courses should not be introduced until the necessary resources are available. In each region the agricultural adviser should check the resources before recommending broadcast of such course elements. The course elements most critically related to external programs or resources are described below.

Course elements A2, A5, and B11 describe farmer credit sources, marketing of products, and purchase of farm inputs. Course B8 introduces artificial insemination services for stock upgrading and B13, vaccination services. All rely on development of services in the region.

Courses B14 and B26 describe local farmer organization for livestock and poultry raising, which are related to local government programs. D1 describes the services available from the Soil Service Institute.

Courses E5 and E6 describe sprinkler and drip irrigation systems that rely on government development of irrigation projects. E7, E9, and E10 relate to government support of projects in water distribution, reclamation of high salinity soils, and land leveling. The planned development of irrigation projects in each province through 1992 is shown in Table IV.4 (Ref. 1, Vol. 2, p. 74). Schedules of courses related to irrigation should reflect progress of such projects.

Courses F3 through F9 describe fertilizer application and must be keyed to local availability of the products. (Courses in weed, insect,

TABLE IV.4

Water Used for Irrigation in Iran by Zones at the End of Each 5-year Plan Period (Million Cubic Metres)

Zone	At The End of 4th Plan							
	Total Water Used	Water Used On Projects			Water Used Off Projects			Water Used On New Land In Projects
		Unimp	Impr.	Total	Unimp	Impr.	Total	
Central	3562	0	1193	1193	1724	575	2299	70
Caspian	5754	24	3709	3733	1147	850	1997	24
North Western	5039	74	143	1510	2604	925	3529	0
Central Zagros	1863	309	414	723	750	362	1112	28
Khuzestan	4414	231	3546	3777	25	375	400	237
Northern Arid	1274	0	485	485	589	200	789	0
Southern Zagros	2685	93	629	722	1488	475	1963	0
Coastal	468	0	226	226	167	75	242	0
Southern Arid	2817	0	1338	1338	1091	388	1479	0
Khorassan	3450	0	233	233	2542	675	3217	0
TOTAL	31326	731	13209	13940	12127	4900	17027	359

Zone	At The End of 5th Plan							
	Total Water Used	Water Used On Projects			Water Used Off Projects			Water Used On New Land In Projects
		Unimp	Impr.	Total	Unimp	Impr.	Total	
Central	3958	0	1138	1138	1711	600	2311	509
Caspian	6261	0	3701	3701	1122	900	2022	538
North Western	5815	46	1517	1563	2592	988	3580	672
Central Zagros	2031	294	436	730	744	375	1119	189
Khuzestan	6727	109	4435	4544	12	388	400	1783
Northern Arid	1666	0	485	485	583	213	796	385
Southern Zagros	3047	93	696	789	1469	500	1969	289
Coastal	570	0	245	245	167	75	242	83
Southern Arid	3315	0	1269	1269	1079	413	1492	554
Khorassan	3551	0	256	256	2530	698	3228	67
TOTAL	36948	542	14178	14720	12009	5150	17159	5069

TABLE IV.4 (cont'd)

At The End of 6th Plan

Zone	Total Water Used	Water Used On Projects			Water Used Off Projects			Water Used On New Land In Projects
		Unimp	Impr.	Total	Unimp	Impr.	Total	
Central	4309	0	1065	1065	1674	675	2349	895
Caspian	6707	0	3454	3454	1079	987	2066	1187
North Western	7074	44	1655	1699	2530	1075	3605	1770
Central Zagros	2425	285	430	715	725	413	1138	572
Khuzestan	7675	49	4756	4805	0	425	425	2445
Northern Arid	1839	0	465	465	577	225	802	572
Southern Zagros	3514	62	774	836	1451	550	2001	677
Coastal	872	0	285	285	161	88	249	338
Southern Arid	3438	0	1148	1148	1060	450	1510	780
Khorassan	3848	0	290	290	2492	775	3267	291
TOTAL	41701	440	14322	14762	11749	5663	17412	9527

At The End of 7th Plan

Zone	Total Water Used	Water Used On Projects			Water Used Off Projects			Water Used On New Land In Projects
		Unimp	Impr.	Total	Unimp	Impr.	Total	
Central	4451	0	1065	1065	1637	750	2387	999
Caspian	7472	0	3514	3514	1035	1075	2110	1848
North Western	8589	28	1852	1880	2468	1200	3668	3041
Central Zagros	2948	188	525	701	701	462	1163	1072
Khuzestan	9523	0	5272	5272	0	425	425	3826
Northern Arid	1982	0	445	445	564	250	814	723
Southern Zagros	3840	0	909	909	1420	613	2033	898
Coastal	1306	0	353	353	161	88	249	704
Southern Arid	3655	0	1139	1139	1035	500	1535	981
Khorassan	4123	0	290	290	2449	862	3311	522
TOTAL	47889	216	15364	15580	11470	6225	17695	14614

At The End of 8th Plan

Zone	Total Water Used	Water Used On Projects			Water Used Off Projects			Water Used On New Land In Projects
		Unimp	Impr.	Total	Unimp	Impr.	Total	
Central	4547	0	1065	1065	1624	755	2399	1083
Caspian	7576	0	3546	3546	998	1150	2148	1882
North Western	8946	0	1883	1883	2449	1250	3699	3364
Central Zagros	3594	0	726	726	688	488	1176	1692
Khuzestan	11784	0	5821	5821	0	425	425	5538
Northern Arid	1989	0	445	445	558	263	821	723
Southern Zagros	3858	0	909	909	1401	650	2051	898
Coastal	1312	0	353	353	155	100	255	704
Southern Arid	3760	0	1139	1139	1023	525	1548	1073
Khorassan	4224	0	290	290	2424	912	3337	597
TOTAL	51590	0	16177	16177	11321	6538	17859	17554

and plant disease control refer the farmer to local experts for information on chemical controls; thus they need not be keyed to availability of specific products.) Course I7 should be related to government support of community action for pest and insect control.

Courses J5 and J17 are related to government projects supporting forage planting in irrigated land and reseeding of rangeland. J1, J3, J6, and J9, relating to planting, should be reviewed when there is introduction of new seed varieties.

These are the course elements that are most critically related to government projects or availability of specific inputs. They amount to 27 out of 108 course elements.

There will be areas where government projects will be at different stages of completion within the same broadcast areas. In such cases, Farmer Informational programming (see Chapter III) can be used to introduce the course elements with appropriate local information on availability of inputs and progress of government programs.

H. SCHEDULING FOR MORE DETAILED REGIONAL DIVISIONS & ADDITIONAL CROPS

The schedules of Section F, of this chapter, have been developed for the "Phase I" group of crops in Iran. It is expected that more course elements will be developed for additional crops. As discussed in Chapter III, Section B.2, addition of a crop will take approximately five 15-minute segments (75 minutes) of programming. Allowing for repeat broadcasts, approximately 10 segments would need to be added to a schedule for each new crop. Summaries of schedule crowding (Fig. IV.20) indicate that five to ten crops could be added to the Phase I schedules without exceeding three half-hour broadcasts per week (five if broadcasts are excluded

from Ramadan, Moharram and the special schedule period, ten if these times are used).

As the additional courses become available, the schedules will have to become more and more specific to local regions. The procedures for identifying common schedule areas would be the same as outlined in Section E of this chapter; because of the additional crops, the common areas would be smaller. The guidelines for arranging course segments for each schedule area would be the same as presented in Section F.

These schedules should be worked out in conjunction with the local agricultural advisers.

The complexity of scheduling will be greater than the first phase schedules developed above, but not a great deal more so. Figure IV.21 shows the areas of similar agroclimatic conditions throughout Iran (Ref. 1, Vol. 3, p.IV.17). As is shown, there are major areas where crops will have the same growing seasons.

The divisions of the country into smaller areas with common broadcast schedules will come more from the variety of crops recommended for different regions than from agroclimatic variations. The National Cropping Plan has recommended crop priorities for different regions on smaller scale than the agroclimatic variation. Taking this into account, regional scheduling of agricultural courses may come down to a scale that is limited by the television distribution system.

As described in Section C of this chapter, individual schedules could be broadcast from as many as 52 separate primary broadcast sites. With this broadcast network, broadcast schedules cannot be made more local than that. The local primary station schedule would have to include existing

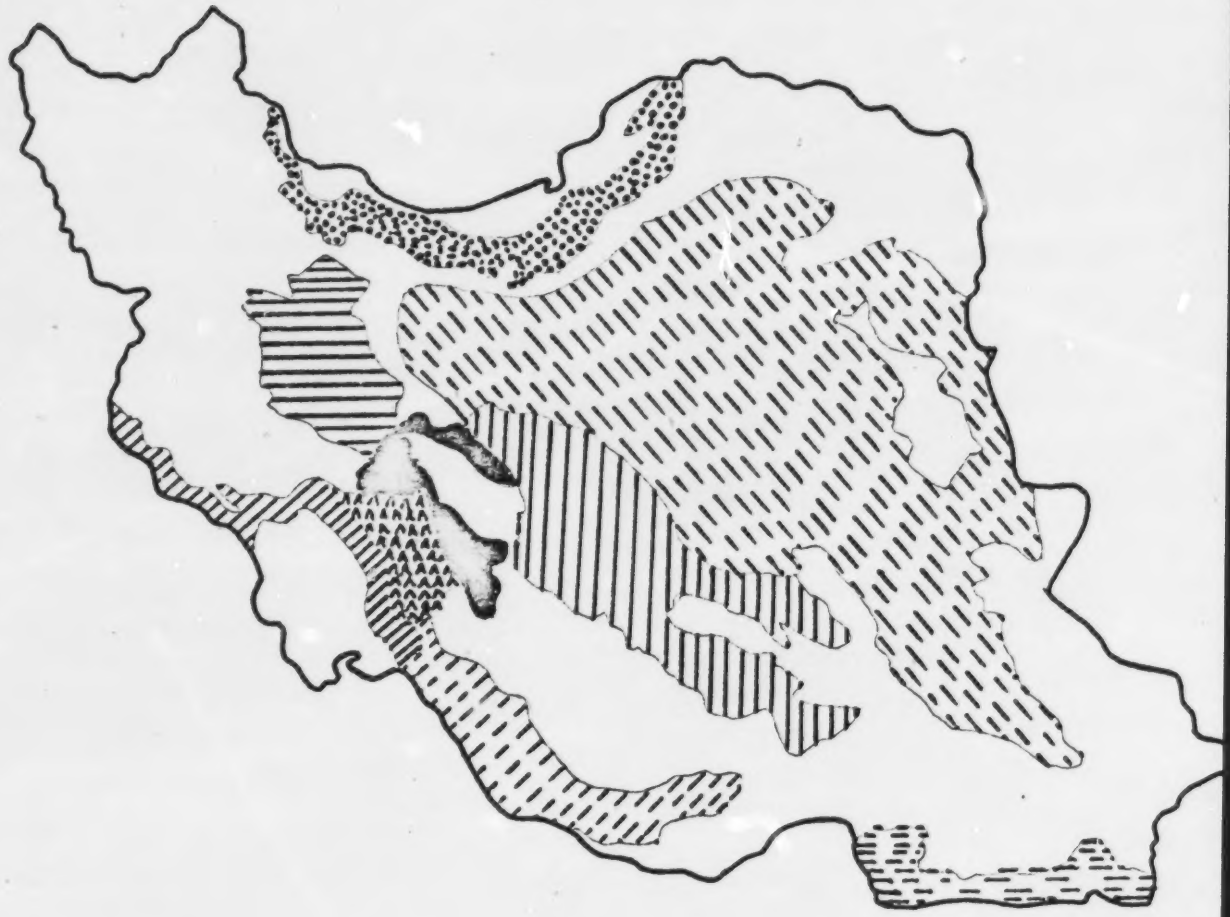

Fig. IV.21 Regions with Common Agroclimatic Conditions

(Areas with similar markings have same conditions; areas not marked (blank) have various conditions)

course elements for all crops recommended in the coverage area of the primary station and its translator stations.

In Table IV.5 the crops that would have to be included in the broadcast schedules of each of the fifty-two primary stations are listed. The first column contains the city of the primary broadcast transmitter. The second column contains the list of agricultural regions in the coverage pattern of that transmitter and its associated translator stations. In the third column are the crops recommended by the National Cropping Plan for those agricultural regions in 1992 (Ref. 1, Vol. 3, VI-18 - VI-20). Crops suited for the region but not recommended are underlined. The stations are listed by province. (Occasionally, a station broadcast area covers more than one province. In this case, the crops are listed under the province containing the primary broadcast station.)

The combination of crops listed after each station would form the crop listing for that station's broadcast schedule (presuming courses are available for each crop). The number of crops for any of the stations is not too great to allow a local schedule to be fit into three half-hour broadcasts per week.

TABLE IV.5

Recommended Crops within the Coverage Area of each Primary Broadcast Station and Associated Television Translators

MARKAZI PROVINCE

Primary Broadcast Station	Regions Covered	Recommended Crop for the Regions until 1992
TEHERAN	Teheran Karaj	Wheat, barley, pumpkins, pulses, sugar beets, oil seeds, clover, maize, summer fodder, cotton*, alfalfa*
	Abali	Rainfed wheat and barley, pulses, potatoes, nuts, apples, vegetables, fruit, winter fodder (barley)
	Qom, Kashan	Mostly range
	Kolardasht**	Rainfed wheat and barley, pulses, olives, rice, deciduous fruits, cotton, apples
	Polur***	Rainfed wheat and barley, pulses, olives, rice, deciduous fruits, cotton, apples
GHAZVIN	Ghazvin	Wheat, barley, pumpkins, pulses, sugar beets, oil seeds, maize, Persian clover, summer fodder, cotton*, alfalfa*
KUH-PANAH	Arak Mahallat	Wheat, barley, sugar beets, potatoes, deciduous fruits, nuts, pulses, alfalfa, winter fodder
	Saveh	Wheat, barley, pumpkins, pulses, sugar beets, oil seeds, clover, maize, summer fodder, cotton*, alfalfa*

* Crop not recommended in this region by National Cropping Plan
** Region in Gilan Province
*** Region in Mazandaran Province

SEMNAN PROVINCE

RION-KUH	Semnan	Wheat, barley, pumpkins, pulses, sugar beets, oil seeds, maize, clover, summer fodder, cotton*, alfalfa*
SHAHRUD	Shahrud	Wheat, barley pumpkins, pulses, sugar beets, oil seeds, maize, clover, summer fodder, cotton*, alfalfa*

TABLE IV.5 (cont'd)

SEMNAN PROVINCE		
SHAHRUD	Sabzavar**	Wheat, barley, fodder crops, grapes, deciduous fruits, oil seeds, potatoes, fruits and nuts, cotton*, sugar beets*
MAZANDARAN PROVINCE		
AGHA-EMAN	Nowshahr Amol Shahi Sari	Rice, oil seeds, stone fruits, jute, winter fodder (barley)
	Gorgan Gonbad Shahpassand	Wheat, barley, pulses, pumpkins, fruits, cotton, maize, oil seeds, fodder crops, rice, alfalfa*
GILAN PROVINCE		
KUH-SANSAR	Astra	Rice, oil seeds, stone fruits, tea, tobacco, citrus, jute, winter fodder (barley)
	Miyaneh*	wheat, barley, clover, oil seeds, fodder crops, rice, pulses, deciduous fruits, maize, cotton*, alfalfa*
	Garmy	Wheat, barley, cotton, winter fodder, maize, oil seeds, sugar beets
	Ardabil*** Sarab***	Wheat, barley, pulses, fodder crops, onions, potatoes
RASHT	Rasht Ramsar	Rice, oil seeds, stone fruits, tea, tobacco, citrus, jute, winter fodder (barley)
EAST AZARBIJAN PROVINCE		
TABRIZ	Tabriz	Barley, alfalfa, oil seeds, grapes, sugar beets, deciduous fruits, maize, clover, pumpkins, pulses, fodder crops, wheat*
	Julfa	Wheat, barley, cotton, winter fodder, maize oil seeds, sugar beets
	Marand	Wheat, barley, pulses, fodder crops, onions, potatoes

* Crop not recommended in this region by National Cropping Plan
** Region in Khorassan Province
*** Region in East Azarbijan Province

TABLE IV.5 (cont'd)

EAST AZARBIJAN PROVINCE (cont'd)		
TABRIZ (cont'd)	Shahpoor**	Barley, oil seeds, alfalfa, grapes, sugar beets, deciduous fruits, maize, clover, pumpkins, pulses, fodder crops, wheat*
	Gotochai**	Wheat, barley, pulses, tobacco, fruits and nuts, sugar beets
	Parsabad** Maku**	Wheat, barley, cotton, fodder crops, maize, oil seeds, sugar beets, winter fodder (clover)
	Khoy**	Wheat, barley, pulses, fodder crops, onions, potatoes
DASJERD	Maragheh Miandoab	Barley, alfalfa, oil seeds, grapes, sugar beets, deciduous fruits, maize, clover, pumpkins, pulses, fodder crops, wheat*
	Miyaneh	Wheat, barley, clover, oil seeds, fodder crops, rice, pulses, deciduous fruits, maize, cotton*, alfalfa*
	Ardabil Sarab	Wheat, barley, pulses, fodder crops, onions, potatoes
WEST AZARBIJAN PROVINCE		
REZAIYEH	Rezaiyeh	Barley, oil seeds, alfalfa, grapes, sugar beets, deciduous fruits, maize, clover, pumpkins, pulses, fodder crops, wheat*
MAHABAD	Mahabad	Barley, oil seeds, alfalfa, grapes, sugar beets, deciduous fruits, maize, clover, pumpkins, pulses, fodder crops, wheat*
ZANJAN PROVINCE		
ZANJAN	Zanjan	Wheat, barley, pulses, fodder crops, rice, deciduous fruits, maize, oil seeds, clover, cotton*, alfalfa*
KORDESTAN PROVINCE		
KUH-BANAFSHEH SANANDAJ KHALICHIAN	Sanandaj	Rainfed wheat, barley, pulses, fodder crops, oil seeds, sugar beets

* Crop not recommended in this region by National Cropping Plan
** Region in West Azarbijan

TABL(ont'd)

KERMANSHAH PROVINCE		
KUH-TAKHT KEREND KERMANSHAH	Kermanshah Bistun Kangvar Shahabad	Wheat, barley, pulses, fruits and nuts, oil seeds, sugar beets, grapes, deciduous fruits, maize, clover, irrigated fodder, tomatoes, cotton*, alfalfa*
KEREND	Qasr-e Shirin	Wheat, barley, cotton*
KUH-TAKHT	Sanandaj**	Rainfed wheat, barley, pulses, fodder crops, oil seeds, sugar beets
HAMADAN PROVINCE		
HAMADAN	Hamadan Malayer	Wheat, barley, oil seeds, pulses, potatoes, grapes, cotton*, sugar beets*
ILAM PROVINCE		
SHAH- NAKHJIR	Ilam	Mainly rainfed wheat and barley, pulses, irrigated fodder, oil seeds, sugar beets, grapes, deciduous fruits, maize, clover, tomatoes, cotton*, alfalfa*
	Dehloran	Wheat, barley, cotton*
LORESTAN PROVINCE		
RAZAN AZNA VIZIAN KHORRAMABAD	Khorramabad Borujerd	Mainly rainfed wheat and barley, pulses, irrigated fodder, oil seeds, sugar beets, grapes, deciduous fruits, maize, clover, tomatoes, cotton*, alfalfa*
AZNA RAZAN	Aligudarz Al-Ashtar	Wheat, barley, oil seeds, fodder crops, pulses, potatoes, grapes, cotton*, sugar beets*
ESFAHAN PROVINCE		
MARSHINAN NAEIN	Esfahan Shahreza Najafabad	Barley, fodder crops, deciduous fruits, nuts, pulses, oil seeds, pumpkins, vegetables, winter clover, wheat*, rice*, cotton*, sugar beets*
MARSHIAN	Semirom Dowlatabad Khonsar	Barley, fodder crops, potatoes, pulses, oil seeds, wheat*

* Crop not recommended in this region by National Cropping Plan
** Region in Kordestan Province

TABLE IV.5 (cont'd)

ESFAHAN PROVINCE (cont'd)		
MARSHIAN NAEIN	Ardastan	Barley, melons, pomegranates, figs, pumpkins, fruits, nuts, wheat*
	Khur Jandach	Range
	Sharekord** Brugen**	Barley, sugar beets, pulses, potatoes, oil seeds, wheat*
	Yazd*** Ardestan***	Barley, melons, pomegranates, figs, pumpkins, fruits, nuts, wheat*
	Dehgaleh***	Range
YAZD PROVINCE		
YAZD	Yazd Ardastan	Barley, melons, pomegranates, figs, pumpkins, fruits, nuts, wheat*
	Dehgaleh	Range
KHUZESTAN PROVINCE		
BOSTAN DEZFUL AHWAZ	Dezful Andimeshk Ahwaz Shushtar	Citrus, vegetables, rice, cotton, sugar beets, sugar cane, pulses, linseed, rice, onions, sorghum, winter potatoes, wheat*, barley*, dates*
ABADAN BOSTAN	Khoramshahr Abadan Badar- E Mashar Badar- E Shahpur	Sorghum, wheat, barley, rice, onions, tomatoes, dates*
AHWAZ DAZFUL DAZAN	Masjed-Soleiman Brhbahan	Sorghum, winter pulses, rice, vegetables, dates, sugar beets, summer fodder, winter fodder (clover), wheat*, barley*
DEZFUL AHWAZ	Izeh	Range with some rainfed wheat and winter fodder (barley)
AHWAZ	Sharekord** Brugen**	Barley, sugar beets, pulses, potatoes, oil seeds, wheat*
	Kuvang**	Rainfed wheat and barley, range

*Crop not recommended in this region by National Cropping Plan
**Region in Chahr Mahal and Bakhtiyari
***Region in Yazd Province

TABLE IV.5 (cont'd)

	FARS PROVINCE	
TAKT-JAMSHID MAHARLU	Shiraz Darab Jahrom Fasa Marvdasht	Barley, citrus, figs, almonds, pomegranates, dates, maize, oil seeds, pomlins, vegetables, clover, wheat*, rice*, cotton*, sugar beets*
MAHARLV DAZAN	Lar Dagonbadan	Wheat, barley, range, maize, pulses, oil seeds, fruits and nuts, winter fodder (barley)
KUH-MALDAN	Abadeh	Range, wheat, barley
KUH-MALDAN DAZAN	Kazerun Yasuj	Wheat, barley, pulses, vegetables, maize, oil seeds, pumpkins, cotton*, sugar beets*
DAZAN	Charam**	Wheat, winter barley, pulses, vegetables, maize, oil seeds, pumpkins, cotton*, sugar beets*
	Kuvang***	Rainfed wheat and barley, range
	Bushahr****	Onions, barley, winter legumes, wheat*, cotton*, dates*
	BUSHAHR PROVINCE	
KANGAN	Bandar-Abbas° Minab°	Barley, citrus, banana, pumpkins, onions, tomatoes, eggplant, peppers, wheat*, cotton*, dates*
KANGAN BUSHER	Bushahr	Onions, barley, winter legumes, wheat*, cotton*, dates*
	SAHELI PROVINCE	
KUH-GENO	Bandar-Abbas Minab	Barley, citrus, bananas, pumpkins, onions, tomatoes, eggplant, peppers, wheat*, cotton*, dates*
	Hajiabad	Range, wheat, barley, sorghum, winter legumes
	Kerman°° Bam°°, Baaf°° Jiroft°° Rafsanjan°°	Barley, cotton, pistachios, pumpkins, pulses, fodder crops, sugar beets, citrus, sorghum, oil seeds, potatoes, vegetables, nuts, wheat*

* Crop not recommended in this region by National Cropping Plan
** Region in Province Boyer Ahmad
*** Region in Char Mahal and Bakhtiyari
**** Region in Bushahr
° Region in Province Saheli
°° Regions in Province Kerman

TABLE IV.5 (cont'd)

SAHELI PROVINCE (cont'd)		
KUH-GENO	Anar**	Range, barley, wheat*
	Hamun** Jazmurman**	Range
KERMAN PROVINCE		
BAM KERMAN RAFSANJAN	Kerman Bam Baft Jiroft	Barley, cotton, pistachios, pumpkins, pulses, fodder crops, sugar beets, citrus, sorghum, oil seeds, potatoes, vegetables, nuts, wheat*
KERMAN RAFSANJAN	Anar	Range, barley, wheat*
BAM KERMAN	Hamun Jazmurman	Range
SISTAN AND BALUCHESTAN PROVINCES		
ZABOLI ZAHADAN PADAGI	Iranshahr Rask Bampur	Range, wheat, barley, cotton, citrus, sorghum, dates*
ZABOLI	Chahbahar	Barley, dates, sorghum
PADAGI ZAHADAN	Zahadan Zabol	Barley, sorghum, some other cereals, summer fodder, range, wheat*
KHORASSAN PROVINCE		
AKHERDAOGHI MASHAAD	Bojnurd Darrehgaz	Barley, wheat, maize, pulses, fodder crops, oil seeds, nuts, deciduous fruits, sugar beets*, cotton*
MHASHHAD SHORAB	Mhashhad Neyshbur Sabzevar	Wheat, barley, fodder crops, grapes, deciduous fruits, oil seeds, potatoes, fruits and nuts, sugar beets*, cotton*
MASHHAD	Sarakhs	Wheat, barley, fodder crops
KUH-KOKAB SHORAB	Torbate- Heydariyeh Torbate-Jam	Wheat, barley, sugar beets, cotton, maize, oil seeds, clover

* Not recommended in this region by National Cropping Plan

TABLE IV.5 (cont'd)

KHORASSAN PROVINCE (cont'd)		
KHEDIRYPASS BIRJAND SHUSF	Birjand Gonabad Ferdows	Wheat, barley, sugar beets, cotton, saffron, cumin, maize, pulses, rice*
	Neybandan Deyhuk	Range, wheat, cotton, barley

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